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Vol. V

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1940

No. 267

SIX COMPANIES OF CALIFORNIA, HARTFORD ACCIDENT AND INDEMNITY COMPANY, ET AL., PETITIONERS,

vs.

JOINT HIGHWAY DISTRICT No. 13 OF THE STATE OF CALIFORNIA

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE NINTH CIRCUIT

PETITION FOR CERTIORARI FILED JULY 22, 1940.

CERTIORARI GRANTED OCTOBER 14, 1940.

No. 9113

United States

Circuit Court of Appeals

For the Ninth Circuit.

SIX COMPANIES OF CALIFORNIA, a corporation, and HARTFORD ACCIDENT AND INDEMNITY COMPANY, a corporation, FIDELITY AND DEPOSIT COMPANY OF MARYLAND, a corporation, THE AETNA CASUALTY AND SURETY COMPANY, a corporation, INDEMNITY INSURANCE COMPANY OF NORTH AMERICA, a corporation, AMERICAN SURETY COMPANY OF NEW YORK, a corporation, MARYLAND CASUALTY COMPANY, a corporation, UNITED STATES FIDELITY AND GUARANTY COMPANY, a corporation, THE FIDELITY AND CASUALTY COMPANY OF NEW YORK, a corporation, GLENS FALLS INDEMNITY COMPANY, a corporation, STANDARD SURETY AND CASUALTY COMPANY OF NEW YORK, a corporation, STANDARD ACCIDENT INSURANCE COMPANY, a corporation, MASSACHUSETTS BONDING AND INSURANCE COMPANY, a corporation, CONTINENTAL CASUALTY COMPANY, a corporation, and NEW AMSTERDAM CASUALTY COMPANY, a corporation,

Appellants,

vs.

JOINT HIGHWAY DISTRICT NO. 13 OF THE STATE OF CALIFORNIA, a public corporation,

Appellee.

Transcript of Record

In Eight Volumes

VOLUME V

Pages 1471 to 1985

Upon Appeal from the District Court of the United States for the Northern District of California, Southern Division.

PARKER PRINTING COMPANY, 545 SANSOME STREET, SAN FRANCISCO

THOMAS MOORE PRICE,

called for the plaintiff; sworn.

Direct Examination

Mr. Marrin: Q. What is your occupation, Mr. Price?

A. I am a civil engineer, by training; but I have always been working with contractors as a superintendent.

Q. Will you state what your education and experience in the contracting business is?

A. I finished college; I graduated in 1912 from the University of North Carolina, getting a literary degree. I taught school for a year in order to pay my tuition; and then I went back to college and took a degree in civil engineering, finishing in 1915. I worked for a contracting firm named Robert G. Lassiter and Company, principally in North Carolina, but on the East Coast for approximately 3½ years. This firm was engaged in general contracting, building of cantonments during the time of the War, and other general contracting work,—no large job; not much larger than a million dollars. At the beginning of 1919, I came West, and—to Seattle, and secured a job with the Kaiser Paving Company in Seattle,—a job as a material clerk; and a few months after that, I was made a superintendent of their work—various jobs, from time to time; I stayed with that company until 1931, in general contract work on the Pacific Coast, largely paving, aggregate production for paving, some earth dams, some

(Testimony of Thomas Moore Price.)

industrial plants. In 1931, I was loaned by Mr. Kaiser to the Six Companies, Incorporated, and I went to Boulder Dam for 4 years; at Boulder Dam, I was in direct charge of the aggregate production and the railroad operations, consisting of moving the aggregate and moving the muck on the job from the dam excavation and from the tunnel out to the disposal point. [1247] This work, during the 4 years I was there, cost approximately ten million dollars.

On September 20th—on or about September 20, 1934, I was ordered to report to the Six Companies of California on the Broadway Tunnel project in Oakland.

Q. What was your position with Six Companies of California?

A. I was called "project manager."

Q. What were the duties of that position?

A. The duties of the position were to handle the business end of the job.

Q. How long did you remain in that position?

A. Why, I am still in it, so far as I know. I stayed with the job until we rescinded the job in June, 1936. Since that date, I was occupied for the first year in looking after the Six Companies of California equipment and tools and other interests on the job; and, since that time, I have been largely engaged in making preparations for this litigation.

Q. After you were employed by Six Companies of California, in September—on September 20, 1934, were you at the site of work daily?

(Testimony of Thomas Moore Price.)

A. Yes, I was, practically every day, during the entire time. I may have been absent two or three days during the period from September, 1934, to approximately a year later. I was not absent over three or four days—I don't think.

Q. Were you frequently in the tunnels while they were being excavated? A. Yes, I was.

Q. You were familiar with the work that was going on in the tunnels?

A. Yes, I thought I was quite familiar with it.

Q. During all the time from September, 1934, up until June 13, 1936?

A. I was quite familiar with the work until the fall of 1935, because I spent approximately 12 to 14 hours per day on the job. After September, 1935, I did not spend as much time on the job. I tried to get out once a day, but some days I was out of town; I was out of town some portion of the time between that time and June, 1936; [1248] but I was fairly familiar with the work most of the time.

Q. What was the status of the work at the time you were employed by Six Companies of California on September 20, 1934?

A. Do you mean the tunnel work or all the work?

Q. Yes, the tunnel work.

A. When I arrived at the job, I found the west portal approach and building excavations largely completed; the west portal ventilating building was constructed approximately up to the first story.—I would say, 35 or 40 feet high; the bottom drifts had been driven quite a way into the hill; some of the

(Testimony of Thomas Moore Price.)

other drifts above had been started; some of the circumferential drifts above the bottom drifts, and the plant in general pretty well along; the concrete plant; the bunkers were practically built; the unloading point for the aggregates was generally constructed, with the exception of some details; the timber plant was in shape, and functioning; the blacksmith shop and the compressor shop, and so forth, were all constructed.

At the east portal, very little work had been done, with the exception of some excavating for the portal buildings—not a great deal.

Q. Well, the tunnel work had been started at that time?

A. The drifts had been started at the west portal.

Mr. Marrin: May I have Exhibits "DD", "EE", "FF", "GG"?

Q. Mr. Price, I refer you to Defendant's Exhibits "DD", "EE", "FF", and "GG," which are an exchange of correspondence between you and Mr. Boggs, commencing on January 9, 1935, and running through to January 24, 1935, with reference to the shutting down of work on the outside buildings. I think you were in court yesterday, when you heard those letters read? A. Yes, I was.

Q. Exhibit "DD," the letter of January 9, 1935, states, in part:

> "In confirmation of our conversation of January 5th with respect to the postponement of work on certain structures you are [1249] advised as follows:——"

(Testimony of Thomas Moore Price.)

Then, that refers to a conversation which you had with Mr. Boggs? A. Yes.

Q. That was held on January 5, 1935?

A. I presume it was; I have no memory of the date, other than the letter.

Q. Were you and Mr. Boggs the only ones present at the conversation?

A. I don't recall. I recall talking to Mr. Boggs.

Q. Do you recall what was said at the time?

A. Mr. Boggs said he would desire us to stop the work on the structures,—the outside structures, principally, as I recall it, the Golden Gate Bridge excavation, the Landvale Viaduct excavation and the upper walls at the west portal building, because of weather conditions.

Q. In your letter of January 18, 1935, to Mr. Boggs,—which is Defendant's Exhibit "EE"——

The Court: Pardon me. What letter is this?

Mr. Marrin: January 9, 1935.

The Court: What is the substance of that letter, so I may refresh my memory on it?

Mr. Marrin: Would you like me to read the letter, your Honor?

The Court: Yes.

Mr. Marrin: This is a letter dated January 9, 1935:

(Testimony of Thomas Moore Price.)

"File: Broadway Tunnel Schedule
"Six Companies of California,
Field Office, Post Office Box 120,
Berkeley, California.

Attention of Mr. T. M. Price, Project Manager.

"Dear Sir:

"In confirmation of our conversation of January 5 with respect to postponement of work on certain structures, you are advised as follows:

"Conditions are unfavorable for work on the Golden Gate Overhead Structure due to the fact that the footing excavations which were opened up more than a month ago have been damaged by exposure to heavy rainfall. It will not be feasible to proceed with the [1250] completion of these footings until the rainy season is over and the damage can be satisfactorily repaired.

"It is not advisable to start footing excavations on the Landvale Overhead and Viaduct structures until the rainy season is over. Conditions similar to those now existing on the Golden Gate Overhead Structure will undoubtedly result if these excavations were made and exposed to the rainy weather which may reasonably be anticipated.

"The right-hand Service Road walls at the West Portal southerly from the South buttress of the Portal Buildings cannot be constructed until the fills which have been necessary on ac-

(Testimony of Thomas Moore Price.)

count of excessive excavation shall have been thoroughly consolidated and no longer subject to settlement.

"Reference is made to Section 6, Subsection (r) 'Temporary Suspension of Work' of the specifications, and you are directed that work on the above structures shall not proceed until conditions are considered favorable by the District Engineer. Such postponement shall not constitute a basis for any extension of time for the completion of the contract.

"It is noted that the schedule submitted by you in August, 1934, contemplated the completion of these units by December 1, 1934; if such progress had been made, the conditions now existing with respect to the Golden Gate and Landvale structures could probably have been avoided.

"Very truly yours,
"(Signed) WALLACE B. BOGGS,
District Engineer."

Mr. Marrin: Q. Then, on January 18, 1935, his reply letter to Mr. Boggs, which reads as follows:

"Mr. Wallace B. Boggs, District Engineer,
Joint Highway District No. 13,
1448 Webster Street,
Oakland, California. [1251]

"Dear Sir:

"We wish to acknowledge your letter of January 9th, directing us to suspend operations on

(Testimony of Thomas Moore Price.)

certain structures until conditions are considered favorable by the District Engineer.

"This is entirely satisfactory with us. However, we note that you state that such postponement shall not constitute a basis for any extension of time for the completion of the contract. We would like to ask your reconsideration of this, in accordance with Paragraph C, Section 4 of the Specifications, wherein it is stated that if stormy or inclement weather unavoidably delays the work such time shall be added to the aforesaid time for completion.

"We are not certain that we will need such an extension. However, the grading of the road is being held up subject to completion of the structures and if the grading is delayed in the summer of 1935 to a date that will make it impractical to lay the oil surfacing, it might be advisable to postpone such surfacing until the spring of 1936.

"Under such a condition, we believe that a request for extension of time on this account would be in order.

"Yours very truly,

"SIX COMPANIES OF CALIFORNIA,

"By (Signed) T. M. PRICE,

Project Manager."

Q. Referring to the last statement there in that letter,—that it will be impractical to lay the oil sur-

(Testimony of Thomas Moore Price.)

facing, and if the grading is delayed in the summer of 1935 to a point that will make it impractical to lay the oil surfacing, it might be advisable to postpone such surfacing until the spring of 1936,—will you state why it might be advisable to postpone this surfacing, or the laying of the paving, if it were delayed until the spring of 1936?

A. The fact that [1252] our contract time ended on May 24th was just a short period after the rainy season, and it would be impractical; and the Engineer had stated he did not want paving laid on wet subgrade; in fact, the specifications, I believe, provide for a certain temperature,—a certain minimum temperature during which it could be laid. I did not seriously regard the delay at the present time, but I could foresee a condition where it might be affected if the structure were not complete, if we were not able to start on the job soon enough in the spring of 1935, and finish and get the grade down, where we would be delayed in the spring of 1936; and the letter expresses my thoughts there.

Q. In other words, if the pavement could not be down in the summer of 1935——

A. It would have to be postponed until 1936,—the summer.

Q. After the rainy season?

A. That was my understanding.

Q. Could the fills and cuts be completed before the tunnel was excavated?

A. A portion of the fills could not be completed.

(Testimony of Thomas Moore Price.)

Q. Will you state why?

A. The fills immediately adjacent to the west portal were contemplated and designed to be constructed of the material which was to be excavated from the tunnel.

Q. If that material were not excavated prior to the rainy season of 1935 and 1936, the fills could not be completed until after the rainy season?

A. That is right. Naturally, the fills could not be completed until we got the excavation out of the tunnel; and we were not sure as to the excavation we would get from the tunnel,—whether it would be acceptable or not.

Q. And the paving could not be laid until after the rainy season was over?

A. On that portion, it could not be laid. There was another reason, too, that I thought might interfere; and that was the fact that some of the cuts on the west approach road showed some [1253] indication of sliding, even at that early date. In fact, some of the drifts, some of the fills, had slid, as well as the cuts.

Q. Following that exchange of letters between you and Mr. Boggs, Mr. Price, did you have any further conversation with Mr. Boggs, respecting an extension of time?

A. Yes, I had a conversation—well, I heard a conversation.

Q. You said "Yes." Will you state, according to your best recollection, the first time after that that you had a conversation with Mr. Boggs?

(Testimony of Thomas Moore Price.)

Mr. Wittschen: This only calls for the time.

Mr. Marrin: Yes.

The Witness: A. To the best of my memory, it was about the middle of May, 1935.

Mr. Marrin: Q. Will you state who was present?

A. Mr. S. D. Bechtel and Mr. Boggs and myself.

Q. Will you state what was said at that time?

Mr. Wittschen: Objected to as irrelevant, incompetent and immaterial, and not binding on the District.

Mr. Marrin: This is on the subject, your Honor, which has already been gone into a number of times, and on which we argued the objection before. It goes to show the state of mind of the District Engineer, and to prove, in his judgment, we were entitled to an extension of time, despite the fact the District formally rejected the request.

The Court: As a matter of law, assuming that he was in that state of mind, and assuming that conversation which you develop would indicate he led them to believe that they were going to get an extension of time, just what would that result in?

Mr. Marrin: Well, if your Honor please, if we can show in this case, as a matter of law, that, in the judgment of the District [1254] Engineer, we were entitled to an extension of time, and if the District did not grant the extension of time, then their action was wrongful and in violation of the contract. While engineers and architects are given

(Testimony of Thomas Moore Price.)

rather wide power under these contracts, the cases are quite clear that they must exercise those powers fairly as arbitrators, and act for both parties, and they must not act capriciously or fraudulently or in the interests of one party as against the other, and that they must exercise their own independent judgment, and must not act under the domination or influence of their employer, the owner, or of anyone connected with the owner.

Now, it is our purpose to show here that this District Engineer either did not exercise any judgment in the matter,—and consequently his action is void; or, if he did exercise or make any decision here, he made it absolutely contrary to his own opinion and belief as to the circumstances. Now, we can show, if your Honor please—and we would like to submit authorities on that question, which we have not submitted yet—that, if that situation exists, his denial is of no effect and may be set aside; and that we are then entitled to the judgment of the Court as to whether or not, under the circumstances, we were entitled to the extension of time.

Mr. Wittschen: The cases hold that the opinion of the engineer cannot be set aside for mistake or for anything else except fraud and oppression, or it may be such a gross mistake as would amount to fraud and oppression, for instance, if he utterly misconceived the quantities of material, we will say, that should go into a certain place, to such an extent that it would amount to fraud.

In this case, however, the extensions of time were

(Testimony of Thomas Moore Price.)

not granted by the Engineer. They were granted by the Board of Directors of the District, on proper application. That application was made. The Contractor was advised by the Engineer that he did not think they [1255] were entitled to it. The two other exhibits, which counsel called for but which were not read, will show the witness on the stand said he did not intend that as an application for extension; he was simply making it a matter of record in case he wanted time in the future, and that it referred to the outside work; the tunnel was the main work; and they had plenty of time, after the tunnel was started, to do that outside work, or to do the outside work while the tunnel was being completed; but, as a legal matter, strictly under the specifications, the Engineer had nothing to do with it; it was up to the Board of Directors.

The Court: The Court is prepared to rule. I will give counsel a record.

Mr. Wittschen: Submitted.

The Court: I will allow it subject to a motion to strike and over the objection of counsel.

Mr. Wittschen: Exception.

Mr. Marrin: Q. Will you state what was said at that time, Mr. Price?

A. Mr. Boggs and Mr. Bechtel were talking——

The Court: Q. This was what date?

A. It was approximately the middle of May, your Honor, 1935. I cannot recall the date exactly.

Mr. Wittschen: Wait just a minute. You have these confused, Mr. Marrin. My objection might

(Testimony of Thomas Moore Price.)

not be—there were two other letters that you are omitting. You read the letter here in January, and now you are jumping to May? Do you mean that?

Mr. Marrin: That is right, Mr. Wittschen. I am not claiming these letters here—I am just bringing them up in sequence.

The Court: Then, as I understand it, it was a conversation between the witness on the stand and the Engineer and Mr. Bechtel?

Mr. Wittschen: Yes; subsequent to these letters; but the way counsel phrased the question, I was calling attention to the fact [1256] there were two other letters in between, that he had not brought up on the same subject.

Mr. Marrin: Those were read yesterday. I did not read them today.

Mr. Wittschen: Very well.

Mr. Marrin: Q. Will you answer the question?

A. May I ask that the question be read.

The Court: Read the question, Mr. Reporter.

(Record read.)

The Witness: A. I came upon Mr. Bechtel and Mr. Boggs, discussing the job conditions, on the office steps,—the job office at the west portal,—and listened to the conversation for approximately 15 or 20 minutes, to the best of my recollection. The substance of the conversation, to the best of my recollection, was about the job conditions in general; and, in the discussion, Mr. Bechtel brought up the point of the difficult ground conditions; and I remember particularly I asked Mr. Boggs, myself, if

(Testimony of Thomas Moore Price.)

he did not consider that those different ground conditions warranted an extension of time; he replied that he considered the ground conditions different from those anticipated and that they did warrant an extension of time, but that he would not be in favor of granting an extension of time at this time, but would recommend that we wait until the proper time, in his opinion,—which would be near the end of the job,—and then make application for the extension. He also stated that we did not know, at that time, whether or not we would need any additional extension of time, and how much we would need, if we did need it.

Q. Is that all?

A. That is the substance of the conversation, to the best of my memory.

Q. Well, did you thereafter at any time discuss with Mr. Boggs the [1257] question of an extension of time?

A. Yes. To my best recollection, I talked with him a few moments in the early part of—about the first week in December, 1935, when I saw him at the west portal.

Q. Who was present at the time of that conversation?

A. I do not recall anyone being present; but I may be mistaken in that regard.

Q. Well, other than you and Mr. Boggs?

A. Other than Mr. Boggs and myself.

Q. What was said at that time?

(Testimony of Thomas Moore Price.)

Mr. Wittschen: We make the objection heretofore stated, on all the grounds as heretofore stated.

The Court: Same ruling.

Mr. Wittschen: Exception.

The Court: It may come in subject to a motion to strike and over the objection of counsel.

Mr. Wittschen: Exception.

The Witness: A. Mr. Bechtel had requested me to help Mr. Hindmarsh prepare data for another application for extension of time and if possible to prepare the data in a way which would not be controversial and would be sure of that time——

Mr. Wittschen: He is asked for a conversation.

Mr. Marrin: Yes.

Q. Just confine it to what you said.

A. I asked Mr. Boggs if he did not consider that the paving that would be necessary in the spring of 1936 would be a legitimate cause for time extension. He stated to me that he did consider it a legitimate cause for time extension.

Q. Was that all the conversation?

A. To the best of my recollection, that is the substance of the conversation.

Q. Mr. Price, I hand you a volume here, consisting of a number of charts. Will you explain to the Court what those are?

Mr. Wittschen: I thought you were not going to introduce them [1258] as an exhibit?

Mr. Marrin: I am not going to. I simply want to explain how it is made up, and what it is. I am

(Testimony of Thomas Moore Price.)

not going to offer it in evidence at this time, except to have it marked for identification, to enable the witness to refer to it for accuracy in his testimony.

Mr. Wittschen: Very well. I thought he was going to use it as a memorandum so he could tell with more certainty and refresh his recollection, without objection to it.

Mr. Marrin: Surely; but I simply want to have the witness explain to the Court how this is made up.

The Court: Q. Did you make that up?

A. It was made up under my direction.

Q. When?

A. Recently; within the last six months.

Q. Have you checked it? A. Yes.

Mr. Marrin: I will ask that that be marked for identification.

(The charts were marked "Plaintiff's Exhibit No. 58 For Identification.")

Mr. Tinning: What do you call it, Mr. Marrin?

Mr. Marrin: That is a composite progress chart; so that we can be clear on it, I will state what it is. It was made up from the records of the Company, and it shows the progress, in some places week by week, and other places day by day, of the excavations, of the drifts; and of the tunnels; and it also shows the progress in placing the concrete in the tunnels. I believe it also shows——

Q. Does it show the timbering, Mr. Price?

A. It shows the square setting.

(Testimony of Thomas Moore Price.)

Q. It shows what steel was placed?

A. Yes.

Mr. Tinning: So we will understand it, by "square setting," you refer to the braces that were set in the tunnel after the slides?

Mr. Marrin: Yes. It is a method of timbering which will be [1259] thoroughly explained by some other witnesses. This is simply a summary of the records of the Company on the facts; and it has been prepared for the convenience of everyone in referring to these things in testimony.

Q. Is that a correct statement, Mr. Price?

A. To the best of my knowledge, it contains nothing but facts; I don't believe it will be controversial in any respect.

Q. Well, to the best of your knowledge, it is accurate?

A. Yes, it is, to the best of my recollection.

Q. Mr. Price, to what distance were the tunnels excavated before the first concrete lining was poured?

A. The south tunnel was excavated to a distance of,—the circumferential drift,—of approximately 92 feet. The north tunnel was excavated approximately in the same manner, to a distance of approximately 110 feet.

The Court: Q. You heard Mr. Larson testify, did you? A. Yes.

Q. Did he give the details of the work and the figures accurately? A. Yes, I thought he did.

(Testimony of Thomas Moore Price.)

The Court: Proceed.

Mr. Marrin: If your Honor please, I do not intend to spend any time going into the details of this with this witness.

The Court: I want to give you the widest latitude, in fact, on both sides, as I indicated at the outset. I realize how important this is to both sides; and particularly this preparation of the digest. My only thought was: if there is any dispute as to the progress, or anything in those details, then it would become important; I think it would be conceded the progress that was made and the various charts were important. That is all I had in mind. You may proceed.

Mr. Wittschen: So your Honor will be clear: our objection on that was that they started to put in, on this progress, not only what [1260] they did, but what everybody else did who finished the job.

Mr. Marrin: No; that is not true.

Mr. Wittschen: Well, that was our objection.

Mr. Tinning: This is not controversial.

Mr. Marrin: Well, it is getting controversial when you make statements of that kind.

The Court: Now, you have been getting along so well around here, I don't want to do anything——

Mr. Wittschen: Well, let me finish this before you get excited. Our objection was to certain matters that Mr. Price has in his hand; if there is going to be controversy as to where they were at a particular point,—if they say in their record they were

(Testimony of Thomas Moore Price.)

here, and if we don't agree with it, we will say "in our records you were there." But I cannot see any necessity for that particular document going in unless the objectionable matters are eliminated; and that they promised to do.

Mr. Marrin: I might say, your Honor, when this was made up, the men in the office inadvertently put in the progress of the contractors who finished and who followed the Six Companies. The other side objected to that; and, during the noon hour, I tried to blank that out in this copy, and we intend to eliminate it permanently.

The Court: Well, for the Court's information, is there any controversy in relation to the progress of this work, as to the dates and the essential things which are important here?

Mr. Tinning: I do not think so, your Honor.

The Court: They have a record, and you have a record. Are you apart in relation to your record?

Mr. Marrin: Well, I don't think we are, your Honor; but unless we get something in the evidence, we have not anything in the record on it.

The Court: I can appreciate that. [1261]

Mr. Wittschen: Haven't you got this from Mr. Larson's testimony?

Mr. Marrin: Well, Mr. Larson was only there until April 30th.

The Court: I realize that.

Mr. Wittschen: Don't you intend to follow that with your other superintendent?

(Testimony of Thomas Moore Price.)

Mr. Marrin: Yes; but I want this witness to give some testimony; and he can give it much more accurately, with this before him.

The Court: Don't be misled by what the Court may do. I don't even suggest to you how you should present your case. I want to be helpful to each side. The thing I was concerned about was the repeating of testimony on things that are not really in dispute; and the repetition of that would not be helpful to either side. That is all I had in mind. I can understand this digest is taken from the original records. They are entitled to the original records, if there is anything in dispute; so, if we get too technical here, we will be here for the rest of the summer. We will take a recess for a few minutes.

(Recess) [1262]

Mr. Marrin: Q. Mr. Price, would you state how many drifts were used in excavating the tunnel on the west portal? A. 13 in each tunnel.

Q. When was the work of excavation resumed after the concrete was placed in the lining in the west portal? On what date was the excavation resumed in the tunnel?

A. It was resumed in the north tunnel on December 5, 1934, and in the south tunnel on November 26, 1934.

Q. Will you describe just generally the method of excavation used from that time, from the resumption of excavation in these tunnels up until August 21, 1935?

(Testimony of Thomas Moore Price.)

A. I will describe the south tunnel first. The first excavation was removing the core of dirt that had been left in place after the perimeter had been concreted. This was done with a power shovel and was excavated up within approximately 35 or 40 feet of the end of the concrete section where we found it necessary to stop the excavation because the dirt sloped on about that slope, about a 40-degree slope, I would judge, which exposed the underground section of the tunnel at the end and prevented excavating any more of the core left in the concrete lining; we found it necessary therefore to leave this dirt in the tunnel, this core in the concrete section at that point and proceed with the excavation of the tunnel at the end of the concrete. This was accomplished by driving a top heading at the top of the arch at the east end of the concrete, driving it in a few feet, 35 or 40 feet, winging that out with additional drifts, and so continuing on down the sides of the tunnel, removing the core as it became necessary or as we cut the top of the tunnel, until we reached the bottom.

Q. The purpose of leaving the core was for support?

A. Leaving the core to support the ground. We had no other support east [1263] of the concrete. The timber that was put in to hold this ground was an experiment on the part of the tunnel superintendent, Mr. Whitmire, at that point, putting in solid timber, in other words, the sets touched each

(Testimony of Thomas Moore Price.)

other, skin-tight, I believe is the tunnel name for it, and they were raked or inclined toward the hill. The pressure of the dirt at the end of the concrete section seemed to be westward toward the concrete, and he and I were both of the opinion if we inclined the timbers toward that pressure and made them solid, that we could hold that ground. That ground was quite muddy, and it was very soft for approximately three-quarters of the cross section of the tunnel. The bottom quarter had some decomposed sandstone in it, some rotten sandstone. As we advanced by this system approximately 40 feet we decided, Mr. Whitmire decided, and I agreed with him, it seemed to be a good plan to change the system and start the excavation at the bottom of the tunnel, driving the drift on grade, and letting the dirt in the side walls fall down to the drift rather than start at the top, as we had to start in the excavating, as far as we could in the concrete section, let the dirt fall down through the drift and then move it out; in other words, we would start with the grade drift, excavate anyway, and excavate the material out of the drift by means of a Bagley scraper; a Bagley scraper is a bottomless bucket. it is a bucket composed of two sides and an end, and as that is dragged over the ground by a power machine the weight of the bucket tends to dig into the ground and get a load of dirt, and it deposits the load immediately where the bucket is stopped, there being no front to it, and as the bucket is

(Testimony of Thomas Moore Price.)

dragged back to get another load it leaves it at that point, and that load is dragged out of the drift. They call it a Bagley scraper. This scraper is pulled by a hoist operated by compressed air. [1264] After the bottom drifts had been excavated a reasonable distance into the hill, 40 or 50 feet into the hill, a second drift was started on top of this, and the dirt dropped into the bottom drift, where it could be pulled out by the scraper to the face and loaded by a power shovel in the same manner as the previous drift, and so on the entire tunnel had been excavated by means of this drift going from one side to the other, and then timbered for a certain distance ahead, approximately 40 or 50 feet, at which time it was felt safe to remove the core. We had to keep the concrete that distance back of the most forward timber in the arch because the core would not stand on the very steep slope, approximately 1 to 1, to prevent ground from caving away into the timber, the same as it had in the concrete section.

Q. What do you mean by a slope of 1 to 1?

A. I mean 1 foot horizontal to 1 foot vertical, about a 40 or 45 degree slope. This method was continued in the south tunnel up to the time of August 21, 1935, with a few variations. Later on we took the hoists with the Bagley scrapers and mounted them on another kind of a jumbo, which consisted of an elevated platform on wheels, so that the hoist would be in line in the drift and high up above the muck cars, so that the cars could pass underneath

(Testimony of Thomas Moore Price.)

the location of the hoist, and also so that they could move forward into the tunnel as the excavation proceeded.

Q. That was the process used on the south tunnel? A. In the south tunnel, yes.

Q. How about the north tunnel?

A. In the north tunnel Mr. Larson wanted to try the wall plate method; he found practically the same condition in the core, at the end of the concrete section as I found, with the exception, I think, there was more of the sandstone in cross section there than there was in the south tunnel, and at [1265] the end of the concrete, as I recall, the mud only extended down that tunnel approximately one-third to one-half of the way and the remainder of the tunnel being in the sandstone formation; he drove a top heading drift in the same way, because it was the only way that the ground could be started forward and advanced down to the wall plate line, I mean by "advanced," he excavated on a circumference down to the wall plate line or the spring line, which is where the tunnel curvature started. He then set wall plates in these drifts and completed his coverage with the tunnel timbering, after which he started the excavation of the core with the shovel and set the plumb posts; as he excavated the core he found it necessary, however, in the beginning, to breast-board the place where the tunnel posts were set, because the core would not stand on a slope steep enough to let him set the plumb post

(Testimony of Thomas Moore Price.)

under the wall plates for quite a distance. He continued in this manner up to 112+52, approximately —I mean he started at station 112+53 and continued up to station 115+67.

Mr. Tinning: Q. Can you give the number of feet where you make that statement and it will save time on cross-examination. How many feet was it?

A. 314 feet, approximately. I might say that in making this chart the average of the core stations is used. With an inclined core it is very difficult to spot a point and say that is exactly the advance, but an average—the station is the average of the core advance. At that point we believe the ground to be better and moved the wall plate up higher to the top of the first segment in the arch. We both believed that the angle formed by the first and second segments in the arch to be a weak place, and we believed that the wall plate at that point would strengthen that weakness or tendency to push in at the junction of those two segments. That system was continued up to station 116+81, approximately 114 feet. [1266]

Mr. Marrin: Q. Mr. Price, can you obtain from that the date you arrived at the various stations?

A. Yes, I can.

Mr. Tinning: Q. When did you arrive at 115+67?

A. 115+67 was arrived at on March 25, 1935.

Q. 116+81?

A. 116+81 was arrived at on May 1, 1935.

(Testimony of Thomas Moore Price.)

The Court: And the next 114 feet?

A. That is the 114 feet I was speaking of.

Q. The first was 300 odd feet? A. Yes.

Q. And the next was 114?

A. Yes. At that point Mr. Larson was relieved from the job, and Mr. Whitmire was placed in charge of both tunnels. We decided that the ground conditions warranted a better handling if we returned to the typical normal wall plate method by driving the wall plate at the normal elevation, which is about the spring line of the tunnel, and the wall plate was consequently lowered at that point and the excavation continued with that method up to station 117+65 on approximately June 18, 1935, a distance of 96 feet, approximately. At that point, at station 117+65, the ground conditions had become so bad that I determined we should go back to the method we were then using in the south tunnel and had been used all along, which had been developed by Mr. Whitmire, and it was proving very satisfactory as far as holding the bad ground was concerned. So we went to that system in the north tunnel at station 117+65 on June 18, and continued with that system until the operations were shut down on August 21, 1935, at station 122+11.

Q. How many feet?

A. A distance of approximately 452 feet.

Mr. Marrin: Q. When you said the operations were shut down, you mean simply driving operations, don't you?

(Testimony of Thomas Moore Price.)

A. Yes, I mean the excavation operations, they were temporarily shut down.

Q. Were the driving operations shut down on August 21, 1935? A. Yes, they were. [1267]

Q. Why were they shut down at that time, Mr. Price?

A. When the excavation of the tunnels was started in the early part of December, 1934, I believed that it would be necessary to see what could be done with the ground before any plans could be made as to what the future procedure would be with respect to both excavating the tunnels and concreting the tunnels. I believed that the normal accepted practice of excavating and concreting would be the most economical and the most practicable method that could be used, namely, by keeping the tunnel open by some means, holding it open, so that your steel forms, movable steel forms, could be used to concrete the lining with in the normal manner. I believed that the worst ground which we would encounter had possibly already been encountered at the west portal, and that the ground would improve as we drove into the hill. I knew that the geological report, by the time we had gotten a short distance into the hill, indicated a better ground, and we hoped that we could hold that ground until we arrived at the point where the better ground was indicated, if we could open approximately 200 or 300 feet of the tunnel it would be better to hold it open in what I understood and believed to be the

(Testimony of Thomas Moore Price.)

worst ground in the whole hill, that the tunnel could be driven and concreted in a normal manner, as I have described. The tunnel was driven approximately 300 feet into the hill, which was completed about April 1. By that time we had been able to get the concrete system planned so that we continued driving, because it was my opinion that the ground would soon get better, because it was supposed to be the worst ground which we would encounter. Approximately sometime in May we went out of the sandstone section of the ground and got into the cherts formation or section, which was supposed to be good ground, and continued in that for the rest of the distance until the excavation was temporarily shut down on August 21. The ground at the beginning of this formation was very [1268] bad, in fact was much worse than the sandstone formation through which we had emerged. I felt, I thought that it must be the Wildcat fault which was spoken of, and which showed in the cross section on the geological report, and considered if we could drive through 90 or 100 feet of that ground that we would then be in the cherts formation which was supposed to be self-sustaining, and we would not have any trouble with the holding of that ground at all, that our worst ground generally laid behind us. The ground up to the beginning of the cherts, with the exception of two places in the north tunnel, one at about station 114 and one at about station 116+60, and all of the ground in the south tunnel had not

(Testimony of Thomas Moore Price.)

shown enough pressure on the timbers to cause the timbers to come into the area to be concreted, with the exception of a short distance right at the end of the concrete section, the section that was concreted in 1934. In the north tunnel those two places had shown pressure immediately after the timbers had been installed, but after we went back and installed additional timbers and put some braces in the movement ceased and no more movement took place. I was quite elated, therefore, when this condition maintained itself day after day without any pressure on these timbers on that first four hundred and some feet, and felt that our troubles were over, as far as holding the ground was concerned. However, along about the end of May, 1935, we had driven into the cherts some distance, and the timbers seemed to be moving, the movement seemed to be worse along the side wall posts, and in about June, the latter part of June, 1935, the pressure became so severe that several of these posts broke under the side wall pressure and several of them became bowed, and we found some places in the tunnel where the timbers were coming in constantly, so we put up cross braces and inclined posts and tried to stop the movement as we had stopped it in the Monterey section, in [1269] the sandstone section. This condition did not improve, and progressively became worse all during July and the early part of August, and I was considerably worried about holding the tunnels open. I had advice from

(Testimony of Thomas Moore Price.)

all concerned. I consulted constantly with the tunnel superintendent and talked to Mr. Bechtel about it, and I talked to Mr. Lawler about it, who came to the job practically every week, and who was somewhat my guiding star in tunnel construction, because I felt he had had more experience than anyone else I knew, and as a result of those conferences, and the timbers continuing to press in, I recommended that the tunnel be shut down, which was done on August 21, the tunnel excavation was shut down; also the concrete program had been late; we were delayed, I felt, through no fault of my own, and we were being required to leave the concrete forms set for 72 hours before moving them, which made the progress of the concrete slow after we had got started. We had not reached good ground, we had passed through what I thought was the worst ground in the sandstone formation, we had passed through what showed in the geological report, what was supposed to be the Wildcat fault, and we just kept getting worse ground and worse ground, and had not hit the cherts that was supposed to be self-sustaining, although we were two or three hundred feet in it, according to the cross section shown on the geological report, and it seemed to me the only thing to do was to shut the excavation down until we could protect it with concrete lining.

Q. Do I understand that at the time the excavation was shut down on August 21, 1935 the trouble with the timbers was in the cherts section?

(Testimony of Thomas Moore Price.)

A. Yes, it was.

Q. Which was at the forward end of the excavation?

A. Which was the last section we had excavated. [1270]

Q. Were you having trouble with the timbers in the first part of the tunnel you had excavated?

A. No, we had not had any trouble with those timbers, except shortly after the excavation was made the timbers intruded somewhat in the concrete section, right into the section to be concreted, right at the end of the concrete section, with the exception of two places in the sandstone where, as described, the timbers had also come in, but on which the movement had stopped.

Q. Mr. Price, I show you here a tabulation which is marked "North Tunnel Excavation Progress." Will you state what that is?

A. That is the excavation progress of the core of the north tunnel in weekly periods.

Q. Does it show from station to station?

A. Yes, from station 112+53 to station 122+11.

Q. I notice at the bottom of that it states "Distance between arch concrete lining and face of core excavation as of August 28, 1935 shut-down." Should that date be August 21?

A. It should be 21.

Mr. Marrin: May I correct that on the original?

Mr. Tinning: Yes.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Now, this tabulation, you might just show the Court, in the first column the stations in the north tunnel.

A. The distance from that station to that station.

Mr. Wittschen: Would you like to give it an exhibit number?

Mr. Marrin: We offer that as Plaintiff's Exhibit next in order.

(The tabulation is marked "Plaintiff's Exhibit 59.")

PLAINTIFF'S EXHIBIT No. 59

NORTH TUNNEL

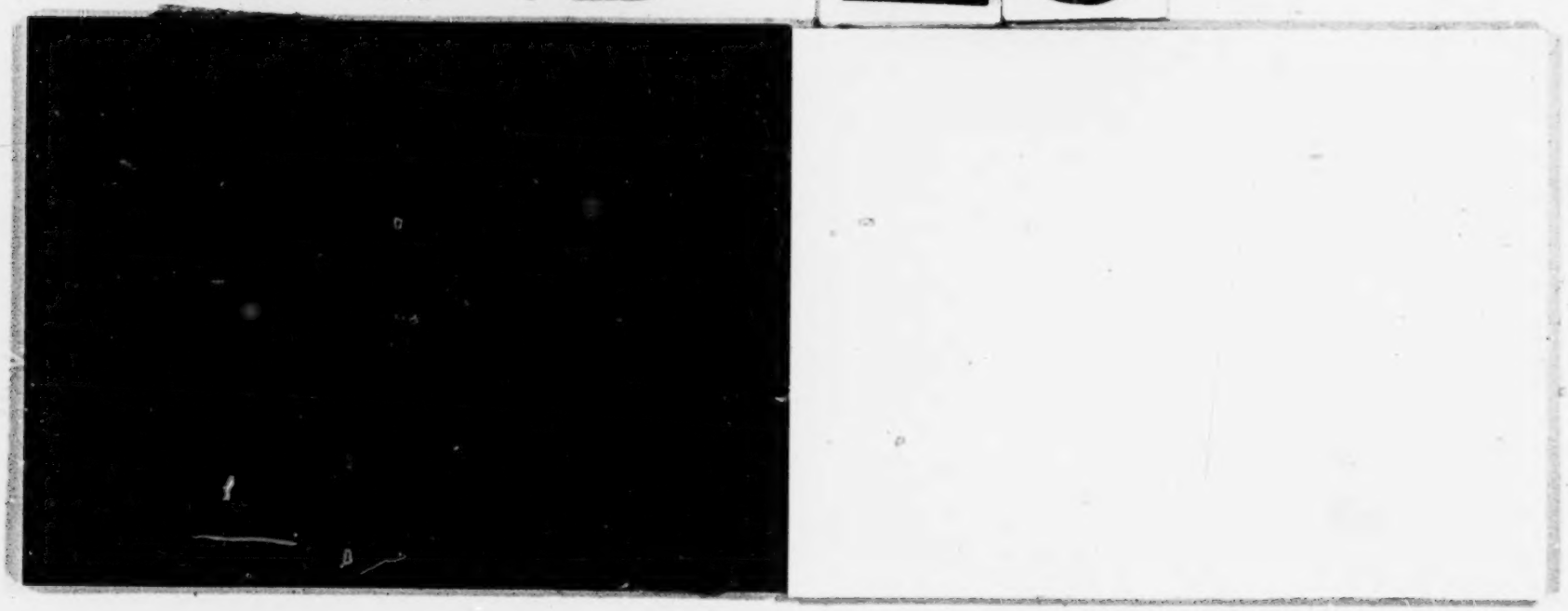
EXCAVATION PROGRESS

Station to Station		Period 1935		Progress
112+53	113+19	1/5	to 1/26	66
113+19	113+43	1/27	2/2	24
113+43	113+69	2/3	2/9	26
113+69	114+00	2/10	2/16	31
114+00	114+26	2/17	2/23	26
114+26	114+61	2/24	3/2	35
114+61	115+00	3/3	3/9	39
115+00	115+31	3/10	3/16	31
115+31	115+60	3/17	3/23	29
115+60	115+67	3/24	3/30	7
115+67	115+89	3/31	4/6	22
115+89	116+05	4/7	4/13	16
116+05	116+34	4/14	4/20	29
116+34	116+61	4/21	4/27	27
116+61	116+81	4/28	5/4	20

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(Testimony of Thomas Moore Price.)

Q. Will you give us the distance through which these wall plates were driven from each end?

A. In the south tunnel—— [1275]

Mr. Tinning: Q. Do you mean this now before August 28th or after?

A. Well, August 21, 1935. The south drift in the south tunnel was started on May 8, 1935. The crossover was constructed and the north drift in the north tunnel was started on June 1, 1935. The station of the south drift in the south tunnel was—the first station was 140 plus 50 approximately. The station of the south drift in the south tunnel was approximately 139 plus 73.

On August 21, 1935, the south drift had been advanced to Station 131 plus 31, a distance of approximately 919 feet.

Mr. Wittschen: Will you read the answer of the witness?

(Record read.)

The Witness: A. The north drift of the south tunnel had been advanced from the crossover to Station 131 plus 30, a distance of approximately 843 feet. The south drift in the north tunnel was started at Station 139 plus 53, on May 6, 1935, and continued to Station 131 plus 41, approximately, on August 21, 1935, a distance of 812 feet. The north drift in the north tunnel was started at the crossover on June 23, 1935, at Station 138 plus 80, approximately, and continued to August 21, 1935, to Station 132 plus 23, approximately, a distance of

(Testimony of Thomas Moore Price.)

approximately 657 feet.

Mr. Marrin: Q. Were those distances of the wall plate drifts through to the excavation in the west portal?

A. No; not at that time.

Q. Was the excavating on those drifts stopped at the time the excavating in the west portal was stopped? A. Yes, it was.

Q. Why was that?

A. The west portal excavating, up to that time, as I explained, had not advanced with the progress which we had hoped to the distance between the two headings; and progress from the west and from the east was so hard that I feared that the penetration of the supposed contact line between the Orindan formation [1276] and the cherts formation might be productive of a lot of water; and we would reach conditions that had been somewhat similar to the conditions that we had reached in the west excava-

(Testimony of Thomas Moore Price.)

Station to Station		Period 1935		Progress
116+81	117+05	5/5	5/11	24
117+05	117+14	5/12	5/18	9
117+14	117+51	5/19	5/25	37
117+51	117+96	6/15	6/22	45
117+96	118+03	6/23	6/29	7
118+03	118+52	6/30	7/6	49
118+52	119+02	7/7	7/13	50
119+02	119+63	7/14	7/20	61
119+63	119+95	7/21	7/27	32
119+95	120+52	7/28	8/3	57
120+52	121+17	8/4	8/10	65
121+17	121+90	8/11	8/17	73
121+90	122+11	8/18	8/20	21
				958

CONCRETE PROGRESS

Station to Station		Period		Progress
112+53	112+61	8/8	8/10	8
112+61	112+79	8/11	8/17	18
112+79	112+96	8/18	8/24	17
112+96	113+13	8/25	8/28	17
				60

Distance between arch concrete lining and face of core excavation as of Aug. 21, 1935, shut-down ..... 898 Ft.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 59. Filed April 28, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

(Testimony of Thomas Moore Price.)

Q. The first column of Exhibit 59 shows the stations in the tunnel? A. Yes.

Q. And the second column shows the period or the date in which the [1271] excavation occurred?

A. Yes.

Q. And the third column shows the number of feet of excavation of the core during the week shown in the second column? A. Yes.

Q. I show you another tabulation headed "South Tunnel Excavation Progress." Does that show the same data for the south tunnel?

A. Yes, it does. That also should be August 21 instead of 28.

Mr. Wittschen: Are you putting those in as one or two exhibits?

Mr. Marrin: Perhaps we had better make them two exhibits. I offer the second one as Plaintiff's Exhibit No. 60.

(The tabulation was marked "Plaintiff's Exhibit 60.")

(Testimony of Thomas Moore Price.)

PLAINTIFF'S EXHIBIT No. 60

SOUTH TUNNEL

EXCAVATION PROGRESS

Station to Station		Period 1935		Progress
112+45	112+86	1/21 to	1/26	41
112+86	113+01	1/27	2/2	15
113+01	113+34	2/3	2/9	33
113+34	113+51	2/10	2/16	17
113+51	113+84	2/17	2/23	33
113+84	114+32	2/24	3/2	48
114+32	114+62	3/3	3/9	30
114+62	114+83	3/10	3/16	21
114+83	115+15	3/17	3/23	32
115+15	115+48	3/24	3/30	33
115+48	115+97	3/31	4/6	49
115+97	116+48	4/7	4/13	51
116+48	116+93	4/14	4/20	45
116+93	117+29	4/21	4/27	36
117+29	117+37	4/28	5/4	8
117+37	117+84	5/5	5/11	47
117+84	118+25	5/12	5/18	41
118+25	118+74	5/19	5/25	49
118+74	119+14	5/26	6/1	40
119+14	119+45	6/2	6/8	31
119+45	119+84	6/9	6/15	39
119+84	120+25	6/16	6/22	41
120+25	120+82	6/23	6/29	57
120+82	121+16	6/30	7/6	34
121+16	121+64	7/7	7/13	48
121+64	122+15	7/14	7/20	51
122+15	122+73	7/21	7/27	58
122+73	123+29	7/28	8/3	56
123+29	123+95	8/4	8/10	66
123+95	124+41	8/11	8/17	46
124+41	124+57	8/18	8/21	16
				1,212

(Testimony of Thomas Moore Price.)

Station to Station		Period 1935		Progress
		CONCRETE PROGRESS		
112+45	112+53	7/20	to 7/20	8
112+53	112+71	7/21	7/27	18
112+71	112+71	7/28	8/3	0
112+71	112+98	8/4	8/10	27
112+98	113+16	8/11	8/17	18
113+16	113+33	8/18	8/24	17
113+33	113+51	8/25	8/28	18
				106
Distance between arch concrete lining and face of core excavation as of Aug. 21, 1935, shut-down				1,106

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 60. Filed April 28, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

I am changing on the face of this in pencil the date from August 28 to August 21.

Q. How was this prepared?

A. This was prepared from original records which we have in the office files, and which form the basis of these documents, here.

Q. And you have checked those?

A. Yes, I have.

Q. And to the best of your knowledge and belief they are correct? A. Yes.

Q. Referring to this tabulation, Plaintiff's Exhibit No. 59, will you state how far the north tunnel had been excavated at the time the excavation

(Testimony of Thomas Moore Price.)

work was shut down on August 21, 1935? That shows excavation beyond the concrete, does it not?

A. Yes.

Q. Will you state how far that had been excavated beyond the concrete on that date? Doesn't that show at the bottom?

A. I was going to subtract the stations, and that would give it. I believe that is the distance, about 898 feet.

Q. Referring to Exhibit 60, the distance is how much? A. 1106 feet.

Q. Now, Mr. Price, was any work done on the east portal of the tunnel? A. Yes.

Q. Will you state what is was?

A. Along in April, 1934, it became [1272] quite apparent that we were not being able to maintain our proposed progress schedule.

Q. April, 1935, you mean?

A. April, 1935, I mean, not 1934, and I believed that it would be practicable to do some work at the east portal for several reasons, the east portal being over a hill from the west portal, it was not practical to use the same plant at all to serve it, to either excavate it or service the job, and I recommended that we build a small plant over there which would supply compressed air and the other necessities for excavating wall plate drifts. I thought it would be advisable to do this from the east portal rather than do it from the west portal, because such an operation should be an operation in itself, and would confuse the work on the west

(Testimony of Thomas Moore Price.)

end, where we were advancing the tunnel by excavating all of the excavation that was to be done in the tunnel—I believed if we could drive wall plate drifts through the west portal to intersect with the operations—I mean from the east portal to intersect with operations from the west portal, that that would have several advantages; it would eliminate all drift work that was being done, that would be done at the west portal in driving the drift as we advanced, and the core was made. I was sure that very soon we would reach ground where we could use at least a wall plate drift system, and if these drifts had been constructed through the hill by the time we reached that ground that progress would be much more rapid and that we could make a much sooner completion of the job; and also these drifts would open up the tunnel, would ventilate the air better, and give us a chance of escape from the regulations respecting the explosive gases in the tunnel, by ventilating it better and giving access at both ends. I consulted with every one of the members of the Six Companies regarding this plan, and Mr. Bechtel, and with the tunnel superintendent, and we all agreed it would be a proper plan to do. [1273] The excavation was started in the early part of May, 1935, and was continued until the shut-down of the excavation work on August 21, 1935.

The Court: If that was a good plan, a good method in May, 1935, why wasn't it in 1934?

A. We did not know the condition of the ground would require it.

(Testimony of Thomas Moore Price.)

Mr. Marrin: I would like to offer in evidence the poster which is on the easel as Plaintiff's Exhibit 61.

(The poster was marked "Plaintiff's Exhibit 61.")

Q. Drawing your attention to Plaintiff's Exhibit No. 61, Mr. Price, will you explain what that illustrates?

A. This illustrates the wall plate drifts as they were driven from the east and their approximate cross section. These dotted lines represent the approximate outside of the permanent concrete that was supposed to go into the tunnel.

Q. By these dotted lines you mean what?

A. These dotted lines.

Q. The perimeter?

A. Yes. The wall plate is shown at this point in the lower left-hand corner of the left-hand tunnel and the lower right-hand corner of the right-hand tunnel.

The Court: About how many feet would that be from the bottom of the floor?

A. That would be approximately 15 feet from the bottom of the floor of the tunnel to the bottom of the drifts; the drifts were, as I recall it, 9 or 10 feet high and there was approximately 10 feet above that to the top of the finished tunnel.

Mr. Marrin: You are referring to the longitudinal section of the tunnel on plaintiff's Exhibit No. 61?

(Testimony of Thomas Moore Price.)

A. Yes. At the top of the poster this shows the spacing in each tunnel, the upper tunnel being the north tunnel and the lower one the south tunnel, this being the west portal at the left and the east portal at the right. The heavy black lines on this portion of the poster represent two wall plate drifts in plan as they were driven from [1274] the east portal westward to intersect with the other work that was advancing from the west toward the east. This cross-over section here indicates that this south drift of the south tunnel was driven in first and then a cross-over driven to drive the north drift of the south tunnel and the same way in the north tunnel.

Q. Why was the cross-over driven?

A. This portal was in very bad ground and it was difficult to get a face that would stand vertical long enough to enable us to get underground even with a small drift; we would excavate and re-excavate, and have ground there which continually came in, and I felt it would be better not to expose too much of it until all had been excavated; it was absolutely necessary to make a face for the men to work there.

Q. The black lines on the longitudinal section of the tunnel running in from the east portal represent the distance through which the wall plate drifts were driven in each tunnel?

A. Yes. That is starting at station—I can give it more accurately from my other data.

tion; and that being driven on a downward grade of 4 per cent, I feared that opening up much water there might be a disadvantage to the drifts, as constructed; and I did not want to go any further and tap that supposed contact line between the two formations.

Q. You say the drifts were on a 4 per cent grade?

A. Yes.

Q. Was the highest part of the drift toward the portal?

A. Yes; the highest part was at the portal. They were being driven downhill.

Q. How was water removed from the drift?

A. By pumping.

Q. You were driving through the Orindan formation? A. Yes.

Q. The water would have an adverse effect on that formation?

A. Yes. It did; very much water in the bottom of the drift; it was a very muddy—as soon as water touched the Orindan at all, it became very muddy; and, in the bottom of the drift, it was almost impossible to walk through it unless you were very sure-footed; in fact, the water seemed to cause the Orindan to disintegrate very fast and work down into mud.

Q. Was any of the ground through which the tunnels were excavated up to August 21, 1935, self-supporting?

A. No, sir; I don't think so.

Q. Did it all require permanent timbering?

(Testimony of Thomas Moore Price.)

A. All required heavy timbering.

Q. If the ground through which the tunnels were being excavated had been self-supporting, could the excavation have proceeded at the same time as the portions of the tunnels which were excavated were being lined with concrete?

A. Yes.

Q. Will you explain that?

A. If we had ground that would be self-supporting, the ground which had not been self-supporting would soon be caught up with concrete, and the ground that would be self- [1277] supporting would not give any trouble, would not delay the operations at all. That was why we had to quit: was because we could not find any ground that was self-supporting.

Mr. Marrin: There was introduced as Defendant's Exhibit "HH," a construction schedule of February 5, 1935. I would like to have it. I may have the wrong number.

The Court: While you are checking up on that, we will take an adjournment until tomorrow morning at ten o'clock.

(Thereupon, an adjournment was taken until Friday, April 29, 1938, at 10 o'clock a. m.) [1278]

(Testimony of Thomas Moore Price.)

Friday, April 29, 1938.

THOMAS MOORE PRICE,

Direct Examination (Resumed).

Mr. Marrin: Q. Mr. Price, I show you Plaintiff's Exhibit 3, which is the specifications for the construction of the project of the defendant, and I will ask you if there is any provision in the specifications dealing with the disposal of the muck or material from the tunnels. A. Yes.

Q. Would you read those to us, please, giving the page and the section number from which you are reading?

A. Under Section 32, sub-heading 5, on page 59, in the left-hand column of the specifications it states:

> "Material excavated from the tunnel section shall be used to make embankments as provided under Section 8, 'Grading' of these specifications, and all operations in placing such material in fills or embankments shall conform thereto; provided, however, that any material which in the opinion of the District Engineer is unsuitable for use in embankments shall be disposed of at the expense of the Contractor in a manner satisfactory to the District Engineer; and provided further that material in excess of that required for embankments and for which, in the opinion of the District Engineer, there is no practicable use on any part of the work, shall also be disposed of by the Contractor at his own

(Testimony of Thomas Moore Price.)

expense and in a manner satisfactory to the District Engineer.

"Material excavated from the tunnel section and required to be used in the making of embankments will be used only on the highway west of the West Portal, and it is contemplated that all tunnel excavation which is suitable for the purpose will be used to make necessary embankments on this section of the highway. No provision has been made for using any such material on the Northeast [1279] highway approach and none shall be placed thereon unless the District Engineer so directs.

"Where excavated material is used for embankments on any part of the work the Contractor will be allowed 'Overhaul' as provided in Section 8, 'Grading' of these specifications, with the following modifications thereof.

"No payment for 'Overhaul' will be allowed for the distance material is transported within the limits of the tunnels, but haul will be measured from the Station of the Portal of the Tunnels, as shown on the plans, and the provisions for free haul of five hundred feet (500') shall apply to any distances material is required to be transported beyond such Portal Station. Overhaul will not be paid where unsuitable or surplus material is required to be disposed of by the Contractor at his own expense."

(Testimony of Thomas Moore Price.)

That refers back to Section 8 of these same specifications, Section 8 beginning on page 11, but the portion I wish to refer to is on page 12, entitled "Embankment," and the subheading under that entitled "Compacting." It has a (b) in front of that word, on the right-hand column of page 12:

"Except as otherwise specified herein embankments shall be constructed in layers not exceeding eight inches (8") in thickness. The sides of the fill shall be placed first and the center shall be carried up lower than the sides. Each layer shall be thoroughly compacted by rolling with a twelve (12) ton three-wheeled power roller or with a tamping roller, the outer surface of which shall be studded with teeth not less than seven inches (7") long and having a surface area of approximately four square inches (4 sq. in.) each; the roller shall be of such a weight that the load upon each tooth will not less than three hundred pounds (300 lbs.). Unless the material when placed in the fill is moist [1280] enough to be properly compacted, each layer shall be watered sufficiently to dampen the material before being rolled. Successive layers shall not be placed until the layer under construction has been thoroughly compacted.

"Embankments built of rock or rocky material shall be constructed in layers from eight inches (8") to not more than eighteen inches

(Testimony of Thomas Moore Price.)

(18") in thickness, and watered and rolled thoroughly with a three-wheeled power roller weighing not less than twelve (12) tons. The use of tamping or sheepsfoot rollers will not be permitted for compacting layers over eight inches (8") in thickness. The thickness of the layers of the material containing large rock shall be the minimum which the size of the rock present in the material will permit, but in no case shall the thickness of the layers exceed eighteen inches (18"). The Contractor will be required to break up oversize rock with sledges or otherwise to make the layers conform to the maximum allowable thickness."

I believe that is all that is pertinent to that.

Q. Now, Mr. Price, referring to Defendant's Exhibit P, which is on the easel, will you step down here and point out to the Court where the fills are located in which these specifications provided the tunnel muck must be placed?

A. This is Oakland, at this end, or the westerly end of the tunnel, and this is the approach leading to the tunnel. This dotted line through the hill represents the tunnel to be constructed, and this is the east portal or the northeast section of the highway, as to which I just read the specifications, which extended beyond the tunnel for approximately 1000 feet or so, not very far. The fills referred to in the specifications are the fills immediately adjacent to

(Testimony of Thomas Moore Price.)

the west portal, approximately a distance of half a mile, I would say. The tunnel ascended steadily, this was approximately 5 per cent. [1281] grade, I believe, compensated somewhat up to the west portal of the tunnel, and the tunnel, itself, was on a 4 per cent. grade still ascending, the highest point reached on the highway traversing the hill was approximately four or five hundred feet east of the tunnel; the road still ascended after passing through the tunnel before the summit was reached on the highway, it was conclusive to me that the specifications providing therefor that the material move through the tunnel westerly to go into these fills, and not over the hill to the fills, that is, they are high hills of steep winding grade--by "steep" I mean approximately 6 or 7 per cent., it made it impracticable to haul any muck from the east portal over the hill into the fills.

Q. Was any fill provided at the easterly portal of the tunnel?

A. There was a small amount of fill, but there was also some excavation there that would amply take care of that fill.

Q. That is the excavation for the east portal building?

A. The excavation for the east portal building, and the road up to it.

The Court: Tell me, was there enough in the core of this tunnel to take care of the fills on either end, or both?

(Testimony of Thomas Moore Price.)

A. Yes, there was approximately 170,000 yards of excavation, according to our engineers' calculations.

Q. I am not good going on yards, tell me generally.

A. I will just give you that approximately 170,000 yards required, and the neat measurement was approximately 207,000 yards; in other words, there was approximately 37,000 to 40,000 cubic yards more than, apparently more than enough to do that fill, if there were no over-break in the tunnel, that is the neat measurement.

Mr. Marrin: Q. What do you mean by an overbreak?

A. If there were no larger section than the actual section required by the specifications. [1282]

Mr. Tinning: Q. What figure did Mr. Price give as the neat measurement of the tunnel?

A. I think approximately 207,000.

The Court: Don't take advantage of what I have in mind.

Mr. Tinning: No, I was interested in the figure.

The Court: I have heard so much about fill, I wanted to know if there was enough to take care of the fill on both ends or either one of them. You say there was? A. Yes.

Mr. Marrin: Q. There was, Mr. Price, if the District Engineer would permit the use of all of that—I say there was sufficient fill if the District

(Testimony of Thomas Moore Price.)

Engineer would permit the use of all of the material taken out of the tunnel for the fill.

A. Yes, I understood there would be sufficient material. However, soon after I came on the job I realized there was going to be some larger sizes than would be needed in the fill, than was permitted by the specifications.

Q. Why could the larger sizes not be used?

A. It would be impracticable to put them in the fills and break them up and down to 18 inches, to make an 18-inch layer; in making an 18-inch layer, a maximum layer of 18 inches in a fill it is very difficult to get a rock which is much more than 12 or 15 inches in diameter to maintain the maximum thickness.

Q. As I understood from your reading of the specifications, the fill was to be laid in a layer 18 inches thick. A. Yes.

Q. And then that was compacted?

A. Rolled, compacted.

Q. And for that reason the large rocks out of the tunnel could not be used?

A. It was impracticable to use them, and for that reason I changed somewhat the system that has been discussed.

Q. I just want to ask you one question about this exhibit, I do not want to criticize the exhibit, gentlemen, but this exhibit P is apparently supposed to show a cross section of this range of [1283] hills——

Mr. Tinning: You are supposed to look at the

(Testimony of Thomas Moore Price.)

hill from a view above and to one side, and it does not really represent a cross section. It is not an architectural perspective drawing, but only a diagram.

Mr. Marrin: Q. There is, however, a range of hills running straight through here on a higher elevation, is there not? A. Yes.

Q. So that there is no valley here, or access from the easterly end of the tunnel to the west?

A. No.

Mr. Tinning: There is a spine or backbone of the hill that runs north and south, and that is what the tunnel is through. If there was a valley we would not have built a tunnel.

Mr. Marrin: Q. If anything were taken from the easterly end of the tunnel and placed on the fills in the westerly end it would have to be hauled up over the road and over this hill, would it not?

A. Yes, it would have to go up the road and through the old highway tunnel, which was open at that time.

Q. Could you give approximately how far that would have to be hauled if that were done, a rough estimate?

A. I would say approximately two miles, with the winding in the road; that is purely an estimate, however, I have not measured it.

Q. That would be a very expensive operation?

A. Yes, it would be rather an expensive operation.

(Testimony of Thomas Moore Price.)

Q. Will you describe what arrangement you made for placing the material from the tunnels into these fills to the west?

A. When I arrived on the job in September there was a railroad leading down from the tunnel to the fill on the approximate grade of the finished road, I think possibly 5 per cent., but there was no provision for making any selectivity of the material out of the tunnel with this railroad. So I threw the railroad to the opposite [1284] side of the valley.

Q. By "threw" you mean you changed it?

A. Yes, I changed it to the opposite side of the valley and built a bin from which trucks could haul the material which would be suitable to make the fills. The material was hauled from the tunnel by means of four-yard muck cars, dump cars, and all of these cars passed over the top of this bin, and any material that was unsuitable, any car that contained any rocks that would be of a size that would be unsuitable to the fill was run on down the fill and dumped off and wasted on private property, largely. By this means I was able to get a rough segregation of the materials without screening it or any other segregation of materials to go into the fill, and generally maintain a material in the fill that was acceptable. I did not know at the time how much of this material would be needed or would be wasted in this fill, or would be required to be wasted by some other decision of the District Engineer; as a matter of fact, I do not recall the District

(Testimony of Thomas Moore Price.)

Engineer ever deciding against any particular material, with the exception that he did not want Orindan material, as I understand it, on the top of the fill. This was one of the reasons, I might say, why it was impracticable to take any more material out of the east end than was absolutely required in order to save the material, as much as possible, for the west approach.

Q. Was there any necessity for completing the fills early in the work?

A. Yes. I felt there was an urgent necessity for completing the fills as soon as possible, because after they had been completed it was necessary to pave them, and if we had not gotten these fills completed early in 1935 it would be necessary for them to go over until the spring of 1936, and with the provisions of the time limit set up by the contract it would not be proper [1285] weather, there would not be proper weather prior to May, 1936, which would permit the completion of the work, and for that reason I was anxious to get all of the material I could into these fills as fast as possible.

Q. Mr. Price, I think you were here when Mr. Larson testified concerning the concrete plan that he contemplated, were you not? A. Yes.

Q. You heard his testimony with respect to that? A. Yes.

Q. When did you first learn of the plan for concreting the tunnel?

(Testimony of Thomas Moore Price.)

A. Immediately after I came on the job in the latter part of September, 1934.

Q. You gave this study at that time?

A. Yes, I did as soon as I arrived.

Q. Did you read the provisions of the specification with respect to the concreting?

A. Yes, I read them and had quite a discussion about them with Mr. Larson.

Q. Did you believe from reading the specifications that Mr. Larson's plan was practicable?

A. Yes.

Mr. Wittschen: He should not be called upon to pass upon the plan of somebody else. You can ask him what he did.

The Court: I think he is going on the suggestion that I probably made, namely, the necessity of not going over the details of Larson's testimony unless there is a dispute about that.

Mr. Marrin: Yes, I did not want to cover a lot of detail if I could avoid it.

The Court: Proceed. It will not help us very much to have one man approve another man's work.

Mr. Marrin: It is more or less preliminary, it is leading up.

The Court: Proceed.

Mr. Marrin: Q. Would you point out the provisions of the specifications upon which you based that belief?

A. I refer to [1286] Section 32 of the specifications, entitled "Concrete Lining."

Q. Would you read it?

(Testimony of Thomas Moore Price.)

A. I was wrong about that being entitled "Concrete lining." It is entitled "Tunnel Construction" with a subheading "Concrete Lining."

Q. On what page?

A. On page 61, subsection "Concrete Lining," entitled "Description":

> "6. Description. The concrete lining for the tunnels shall consist of the concrete arch ring as shown on the plans, with steel reinforcing as designated or as otherwise directed by the District Engineer.
>
> "The thicknesses of concrete shown are minimum thicknesses, and the attention of the Contractor is directed to provisions hereinbefore set forth in this section, requiring additional concrete as made necessary by the methods of excavating, timbering, or otherwise supporting the excavation.
>
> "7. Materials. Concrete for lining shall be Class 'B' concrete, as provided in Section 13, 'Portland Cement Concrete,' of these specifications, and the provisions thereof and the provisions contained in Section 15, 'Concrete Structures,' shall apply to all concrete in tunnel linings except as modified herein. Grouting shall be performed as elsewhere specified in these specifications."

This comprises the extent of that section on concrete lining of tunnels and refers back to Section 15 of the same specifications.

(Testimony of Thomas Moore Price.)

Q. Is that on page 25?

A. Page 25, Section 13, under the subheading, "Placing Concrete."

> "Concrete for the tunnel lining shall be placed continuously between any two (2) adjacent construction joints, in lifts not more than six feet (6′) deep, measured in a vertical direction. The topmost lift, having a width not to exceed eight feet (8′), shall not be placed until the adjoining concrete on both sides [1287] has been in place for at least seven (7) days, unless otherwise directed by the District Engineer.
>
> "All concrete shall be used while fresh and before it has taken an initial set. Concrete shall not be used after more than thirty (30) minutes have elapsed from the time water was first brought into contact with the cement."

on the same page, under subheading 12, it states:

> "Concrete shall be deposited in uniform horizontal layers, not deeper than twelve inches (12″), care being taken to avoid inclined planes or inclined construction joints. Construction joints must be built with square ends and level tops, except as otherwise directed by the District Engineer; in arch type structures, joints shall be made at right angles to the axis of the rib. Each layer shall either be placed before the previous layer shall have taken its initial set, or, if the previous layer

(Testimony of Thomas Moore Price.)

has taken its initial set, the surface of the previous layer shall be prepared as herein specified for the preparation of hardened surfaces."

I would like to read the two paragraphs immediately preceding that also on the same page.

Q. What page is that?

A. Page 25, Section 15:

"Concrete shall not be permitted to fall from a height greater than six feet (6'), except through an enclosing pipe, in which case the height of fall shall not exceed twelve feet (12'). An enclosing pipe may be required by the District Engineer for placing concrete in columns, walls and deep footings.

"Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than three feet (3') in a horizontal direction. Care must be taken not to displace the reinforcement, pipes, anchor bolts or other devices which are to be embedded in the concrete." [1288]

Q. Now, at that time were you familiar with the placing of concrete in tunnel lining by the pneumatic gun method?

A. Yes, I was reasonably familiar with it.

Q. Would you mind stepping to the board and diagram briefly the method which had been used to your knowledge in placing concrete in tunnel linings by the Hackley gun method?

(Testimony of Thomas Moore Price.)

The Court: We will take a recess for a few minutes. [1289]

(After Recess)

Mr. Marrin: Q. Mr. Price, you have made a drawing on the board. Will you explain the methods which, in your experience, have been used in placing the concrete with the Hackley Gun?

A. This is a rough representation of the tunnel, looking at it from the side. This is to represent it as looking at it from the end of the tunnel. This would be the area to be concreted. The forms would be here, the inside line of this section on the right-hand side, and the material through which the tunnel was driven, with temporary support, would be this outside line; the concrete lining to be filled, the area between the forms, and between the outside of the tunnel excavation. This is a longitudinal section, and I have attempted to illustrate a section of the concrete that has already been poured. I could not show it all here; but it extends from here up to here. This line here would be that line there,—about like this. This is intended to represent a pneumatic gun of some description, and this is a discharge pipe from the gun which is generally placed so it has the least curvature possible for concreting, and the concrete to be pushed by compressed air up through this pipe and into the forms.

The general practice of pneumatic equipment, so

(Testimony of Thomas Moore Price.)

far as I know, and I believe yet, in placing concrete in tunnels, is to put the material in as fast as possible. In other words, that should be done with any concreting system, because, in my experience, the best concrete is a concrete that is placed the fastest, so there is less chance to get what we call "cold joints." Particularly with a pneumatic system gun, the concrete should be shot in to a mass of concrete that is obtained at the end of the pipe; that is necessary, by the fact when a pneumatic gun discharges concrete it has somewhat of a tendency to segregate the mortar from the rock particles that make up the concrete; and, shooting that into a mass of fresh [1290] concrete, tends to remix that and make it a more homogeneous mixture. The general practice is to shoot your concrete and let it fall over the sides of the forms, down to the bottom, and let it stop at the bottom, like this,—the concrete running down these inclined layers as fast as possible, on one side, then on the other side. It is true it roughly makes layers; and my understanding of the particular paragraph referring to concrete tunnel concrete was the elevation between these two layers, the vertical distance between the lifts, as the engineer calls them; he said it should not exceed 6 feet. If you shoot concrete with a pneumatic gun into the form, into a mass of fresh concrete, there is no danger from falling concrete; it hits that soft mass and absorbs the blow, and protects the men who work back of the concrete in the

(Testimony of Thomas Moore Price.)

forms,—inside here,—in vibrating it or anything else that is necessary. I have not got this drawing quite long enough; but, as that fills up, the usual plan is to withdraw this whole arrangement,—the pipe and the pneumatic gun—put it back into the tunnel further; the layers of concrete built up until at last there is only a small opening here. When the pipe is pulled out to the edge of the form, and the concrete dumped into it, as much as possible, before it is finally withdrawn and the hole closed up——

The Court: Q. How many feet is that from the floor to the ceiling?

A. Well, I would say approximately 30 or 32 feet, I believe, in the Broadway Tunnel.

Q. The specification says something about a limit of 6 feet?

A. That was the point I wished to bring out. I did not think the specification, because of the paragraph set aside for tunnel concrete, referred to concreting in the tunnels. I knew we had been doing that on the outside concrete. We had been pouring concrete for six months, at least—well, not six months; but considerable concrete [1291] had been poured, and we had adhered, so far as I know, rigidly to those specifications which required concreting to be placed, put in half of the form over 3 feet and not over 6 feet; but in view of the fact the Engineer had set aside this paragraph specifically on tunnel lining, I assumed that was a modification of the——

(Testimony of Thomas Moore Price.)

Mr. Wittschen: Your Honor, there is nothing in the notice of rescission that says they rescinded because the concrete was required to be placed in a certain way, and that the Engineer made the interpretation of the specification in such a way that they were either delayed or misled by that; and, while it is very interesting to know how they laid the concrete in the tunnel, and I have no particular objection to it, it is wholly immaterial.

Mr. Marrin: I think it is very material. The plaintiff had before it, at the time it bid, these specifications; it did not have the benefit of the Engineer's interpretation of it at that time, or the interpretation he was going to place upon them. It was necessary for the plaintiff to plan a method of placing concrete which it believed would be permitted by the specifications and which was in accordance with the usual practice in placing tunnel linings in other projects; and the plaintiff went ahead and made its plans based upon that interpretation of the specifications. It developed later, because of the Engineer's interpretation of the specifications, that this method could not be followed out practically, and it was necessary at that point to make a radical change in the method of placing the concrete in the lining of the tunnel, and that caused a considerable delay in placing the concrete. It is those facts we desire to bring out.

Mr. Wittschen: Section 15 of the specifications says: [1292]

(Testimony of Thomas Moore Price.)

"Concrete shall be deposited in uniform horizontal layers, not deeper than twelve inches (12″), care being taken to avoid inclined planes or inclined construction joints."

And those are inclined planes; they are not horizontal. I am reading from page 25. Assume that everything Mr. Marrin says is true: what difference does it make? They did not make any claim they were misled; they did not say, "We don't want to do it." They did not say, "We are going to walk off the job," and they did not rescind on that ground; they rescinded for something entirely different; and all the details of their various motions in building the tunnels are wholly immaterial. This case will have to be decided, as I view it, upon the reasons stated in the notice of rescission; and this is not one, and neither is there any other claim, in writing or otherwise, objecting to the Engineer requiring them to lay it horizontally.

Mr. Marrin: Of course, while that section is in the specifications, Mr. Wittschen, there is also another specific section that says that concrete for tunnel lining shall be placed continuously between any two adjacent construction joints, in lifts not more than six feet (6′) deep, measured in a vertical direction,—specifically referring to tunnel lining.

As to materiality, this evidence, if your Honor please, goes to the question of time. If the work was delayed for causes which were beyond the control of the Contractor, then it is our contention the Con-

(Testimony of Thomas Moore Price.)

tractor is entitled to an extension of time. In connection with that, we feel we are entitled to show all the circumstances in connection with the construction, so the Court may determine whether the plaintiff was delayed by causes beyond his control; and there has been, in the cross-examination of other witnesses, criticism of the fact that the concrete lining was not laid up closer to the face, and we desire to show the facts in connection with that.

[1293]

This witness has testified, if your Honor please, that this interpretation of this provision was that the lifts which could not be more than 6 feet, measured vertically, were the lifts between each of these layers; in other words, these lifts could not be more than 6 feet deep, measured in a vertical direction.

Mr. Wittschen: Are those horizontal, Mr. Marrin?

Mr. Marrin: No; they are not. In this provision with respect to the tunnel concrete lining, there is nothing said about it being horizontal.

Mr. Wittschen: I just read it. It is under "General Concrete"; and they refer to that at page 25, on the right-hand side:

> "Conveying, Placing and Compacting Concrete. Concrete shall be deposited in uniform horizontal layers, not deeper than twelve inches (12"), care being taken to avoid inclined planes or inclined construction joints. Construction

(Testimony of Thomas Moore Price.)

joints must be built with square ends and level tops, except as otherwise directed by the District Engineer; in arch type structures——"

This certainly was an arch type structure——

"——joints shall be made at right angles to the axis of the rib. Each layer shall either be placed before the previous layer shall have taken its initial set, or if the previous layer has taken its initial set, the surface of the previous layer shall be prepared as herein specified for the preparation of hardened surfaces."

I am willing to concede you are right, for the argument. I still think it is wholly immaterial, in this controversy, because they contracted to build a tunnel; they contracted to leave certain things to the Engineer—and let us assume they are correct, that he misinterpreted the specifications: He had a right to misinterpret them because they agreed that his interpretation should prevail; and it does not make a bit of difference, particularly when you come down to the fact they never once objected to it, in writing, and never once [1294] noted it as a ground for rescission.

Mr. Marrin: We are not attempting to attack the Engineer's decision on this. We are simply showing he had reasonable cause to believe, from these statements, that the method was a practical method; and the other provision with respect to concrete in the tunnel lining being placed in lifts of not more than 6 feet, measured verticaly, is a

(Testimony of Thomas Moore Price.)

specific provision referring to the tunnel lining. The section you have read is a general——

Mr. Tinning: What section do you refer to now?

Mr. Marrin: On page 25:

> "Concrete for the tunnel lining shall be placed continuously between any two adjacent construction joints, in lifts not more than six feet (6′) deep, measured in a vertical direction."

Now, the other provision relates to other concrete; and there were many structures,—outside structures and buildings,—which were to be constructed with concrete; and, as we want to show, that construction—it was provided for placing concrete horizontally in one foot layers; that was meant to refer to those structures; but we don't question the Engineer's decision, in insisting upon the method, except as it shows that the method which we proposed, and we had a right to assume we could use, was impracticable in view of his construction of the specifications.

The Court: That goes back to that phrase I used, —a homely phrase: that all the Engineer was, was an umpire.

Mr. Wittschen: Yes.

Mr. Marrin: On this particular subject, we did not have the benefit of his decision before we bid upon these plans and specifications.

The Court: I know very well you did not.

(Testimony of Thomas Moore Price.)

Mr. Wittschen: Well, nobody had.

The Court: Nobody had. I am trying to analyze this; that is [1295] the reason I suggested that the language in the specifications, aside from the fact counsel indicates even though he misrepresented it, it would accomplish nothing by this testimony.

Mr. Marrin: Well, I think it would, your Honor. It would show we were in good faith, if it was a reasonable interpretation.

The Court: I am not questioning anyone's good faith.

Mr. Marrin: We, in good faith, did everything we could to get the plans arranged and go ahead with the work.

Mr. Wittschen: When I said it did not make any difference, I still stand by that; but you produce these paragraphs—the one you called for and the one we called for; they are on the same page; and it says he shall place them horizontally. I think you have utterly misconceived it; but, for the sake of putting on my argument, I am willing to admit the Engineer utterly misconceived it. However, his judgment controls; and if he interpreted "horizontally" to be in a straight line, I don't think you can find any fault with it.

The Court: Well, I want to give you a record, of course, on whatever you have in mind; but I rather agree with counsel's view, namely, that the specifications provide for this method and the manner of procedure.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Well, perhaps that is true, your Honor; but I think, nevertheless—we are offering this testimony, if your Honor please, for the purpose of showing the plans that we had for placing the concrete; and will follow that by showing we could not place it by this method, and the steps that were taken to remedy that situation to meet the Engineer's objection and his interpretation.

The Court: I will give you a record on it; but I have indicated my state of mind. However, I want to give you a record. I am satisfied this is the best example of it. Of course, the Contractor pursues the most economic method he can, under the circumstances. [1296] He tried probably to satisfy the Engineer. However, in this phase of the work, there was not any controversy, that I recall from what has been placed in the record to date.

Mr. Marrin: Well, there is a controversy, if your Honor please.

The Court: Well, if there has been up to this point, I have failed to understand it.

Mr. Marrin: Proof of that will be developed,—the concrete lining proposition,—before this case is closed. We propose to show, on our case, simply what we did, and the plans we made, and whether or not the concrete was placed; that will be shown eventually. In other words, this evidence is of facts.

(Testimony of Thomas Moore Price.)

Mr. Wittschen: Well, the notice of rescission did not specify any interference with the concrete. The notice of rescission or no letter ever objected to the District Engineer's interpretation of the concreting situation. This is bringing into the case—and the authorities are uniform, when one rescinds on a specific ground,—as the Supreme Court of the United States has said in one case,—he cannot come into court and assert other grounds, —he cannot mend his hold and here you are asserting something new and different, as a ground of your action.

Mr. Marrin: No; we are not. We will connect this up and show that the delay resulting from the concrete operation here slowed up all of the work. We did rescind, on the ground that we were entitled to an extension of time, which was refused. We did rescind, on the further ground that a penalty was imposed which was unjustified, and this is part of the facts going to prove our case on that issue. We did not, if the Court please, attempt to specify in the notice of rescission everything that happened on the job.

The Court: You may proceed. I have indicated I will give you a record, so you will not lose any of your legal rights. I will rule finally. I have indicated my view. [1297]

Mr. Marrin: Yes—not to go into this any further?

(Testimony of Thomas Moore Price.)

The Court: You may have a record on it. I don't want to construct this tunnel again, if I can avoid it. I don't want to mislead you, or don't want to waste your time, much less my own. If you want a ruling, I will give a ruling, so that you have a proper record here. I will give you the privilege, of course, to show what you wish.

Mr. Marrin: I don't understand quite the state of the record.

The Court: Even though I disagree with your view, I want you to have a record; so, if I am in error, after you leave here at least you will have a record to comfort you.

Mr. Marrin: Thank you, your Honor.

Q. Mr. Price, were you able to pour the concrete, in the west portal section, in the manner which you have indicated on the blackboard?

Mr. Wittschen: We object to that, on the same ground.

The Court: Overruled.

Mr. Wittschen: Exception.

The Witness: A. No; we were not able to pour it that way.

Mr. Marrin: Q. How were you required to pour it?

A. We were required to pour it——

Mr. Wittschen: I—I make the same objection. How he poured the concrete is wholy immaterial, and it is not a basis for rescission, if your Honor please.

(Testimony of Thomas Moore Price.)

The Court: Objection overruled.

Mr. Wittschen: Exception.

The Witness: A. We were required to pour it in conformity with the general specifications on structural concrete, which required that the concrete would not be moved in the forms over 3 feet, and shall not be put in, in layers over one foot in thickness.

Mr. Marrin: Q. Did you thereafter change your plan for pouring [1298] the concrete lining in the tunnels? A. Yes.

Q. Will you state what you did, in that connection, in the change of plan?

Mr. Wittschen: We object to that as immaterial and not a ground for rescission.

The Court: Q. You may answer.

Mr. Wittschen: Exception.

The Witness: A. After the concrete in the portal section had been stripped, in the early part of December, 1934, the concrete was inspected early in January by Professor Raymond E. Davis of the University of California, and the District Engineer, Mr. Bogs; and they pointed out to me that there were inclined joints, apparently cold joints, existing in this portal concrete, and that there were some rock pockets in it; and the District Engineer stated to me that further concrete of that type would not be acceptable.

In the pouring of the portal concrete, by the pneumatic gun, we had—the decision was imme-

(Testimony of Thomas Moore Price.)

diately upon me; and, at that time of the year, I arrived on the job—it was late in the fall—the concrete had to be poured some way just as quickly as possible, in order to protect the portal structure of the tunnel, and make it possible to work in the tunnel during the winter months. The concrete plant was not ready; the supply of concrete was not ready; and I used any emergency method I could. I obtained concrete to pour on the portal section. There was a concrete plant set up, owned by the subcontractor, K. E. Parker Company; and we used that in pouring the south tunnel. It did not function very well, and we were not able to get over 8 yards per hour. When we poured the north tunnel, we obtained permission from the Engineer to pour it in lifts along the side walls, 15 foot lifts, I believe; and obtained concrete from a paving mixer, which we set up in the portal to [1299] supply the pneumatic gun; and, in order to get it done just as quickly as possible, the Engineer told me he would let me use that method for that section, but it would not be permitted in future concreting. With the use of that method in the north tunnel, we were not much better off; we could not make much better than 8 cubic yards per hour. In other words, it was so slow it was impossible to prevent cold joints from forming in the concrete; and, naturally, a cold joint is, I think, the worst thing that can happen to concrete. I concluded, from this, that it would be impracticable, if not probably im-

(Testimony of Thomas Moore Price.)

possible, to pour the concrete and comply with the Engineer's specification, with the pneumatic system; and I set about to find some other system that could be used. The pneumatic system was the only system, at the time, that had been used for a number of years, and had proved practicable, and it was particularly practicable in this tunnel, from the standpoint of complying with the Industrial Accident Commission's requirements.

Mr. Wittschen: I submit your witness has answered the question.

Mr. Marrin: No; he has not.

Mr. Wittschen: You did not ask him anything about the Industrial Accident Commission or any compliance with Mr. Davis's order. I have given him a lot of latitude.

The Court: Answer the question and proceed.

Mr. Marrin: Q. Will you just state what you did, in connection with changing the concrete plans or plants for placing the concrete?

Mr. Wittschen: To be consistent, your Honor, I make the same objection.

The Court: Overruled.

Mr. Wittschen: Exception.

The Witness: A. I looked into the method of pouring concrete by the Pumpcrete method, manufactured by the Chain Belt Company of Milwaukee, Wisconsin.

Mr. Marrin: Q. What did you know of the Pumpcrete method? [1300]

(Testimony of Thomas Moore Price.)

Mr. Wittschen: I object to that as immaterial, what he knew about it. It is not binding on us. It was their obligation to lay the concrete, and on all of the other grounds stated.

The Court: I will allow it.

Mr. Wittschen: Exception.

A. What was the question?

The Court: He wanted to know what did you know of the Pumpcrete method. Describe what that was.

A. The pumpcrete method was a machine based on a German patent manufactured by the Chain Belt Company, of Milwaukee, Wisconsin, which consisted essentially of a reciprocating pump which forced the concrete by piston pressure through pipes into the place where it was to be used.

Mr. Marrin: Q. Will you go ahead and state what you knew of the use of that Pumpcrete method at that time?

A. It was quite a new method in this country, and we had been through an operation with it at Boulder Dam for two years preceding this. The Chain Belt Company had asked the Six Companies to take one of these pumps and try it out down there and see if we could make it work, and we did succeed in making it work on 1½-inch aggregates, in exposed places around the job, and I believe in some cases in small tunnels where 1½-inch aggregates were acceptable. However, the machine had not been developed fully at all, and had not been

(Testimony of Thomas Moore Price.)

proven with respect to completing the arch in the lining of tunnels. The specifications for aggregates on the tunnel were 2½ inches in size, and it was about the latter part of the season of 1934 that they had made an improvement in the pump which permitted it to pump the concrete manufactured with 2½-inch aggregates.

The Court: The ultimate fact, however, was you were able to go on with the work under this method?

A. No, we were not at that time. [1301]

Q. I misunderstood you then.

A. I was getting around to the point that the machine had always been driven by electricity, and we could not have electric power in these tunnels.

Mr. Marrin: Q. Was this machine a standard factory product at the time?

A. No, it was not a standard factory product.

Q. Was it being put out specially for this job?

A. Yes, they had an engineer who was designing the machine at the factory and came out with the machine for the job, Mr. C. F. Ball.

Q. What were the problems that had to be worked out with this machine before it could be used on this job?

A. The application of the power was the most important problem; we were prevented from running electric cables or wires of any kind into the tunnel by the provisions of the Industrial Accident Commission, and we could not use the motors in the tunnel, except a special type of motor called "Ex-

(Testimony of Thomas Moore Price.)

plosion Proof Motors," and it was practically impossible to get them in that size and to drive them after we got them in, because we could not get batteries enough in there to continuously operate them; it was impracticable to supply air motors to the Pumperete, because of the power required by the machines.

Q. Do you mean by that that some kind of power was necessary to drive the pump? A. Yes.

Q. The kind of power that was previously used was electric motors? A. Yes.

Q. Due to the regulations of the Industrial Accident Commission the motors previously used were not permitted in the tunnel? A. Yes.

Q. Did you communicate with the Chain Belt Company with respect to this matter?

Mr. Wittschen: Objected to.

Mr. Marrin: I am not asking for the communication. [1302]

Mr. Wittschen: I don't know, my experience is limited, but can we have an objection to all of this without repeating it?

The Court: As I have indicated, I want both sides to have a record, and I will permit any reasonable latitude. But let us take the phase of this problem now that we are talking about and analyze it for a moment. How could that be charged, under these plans and specifications, to the District? I am speaking legally, and after all, of course, this will have to be finally determined legally.

(Testimony of Thomas Moore Price.)

Mr. Marrin: I am not trying to charge them with a breach on account of the concrete. I am simply trying to bring out, to show to your Honor that we used every effort to produce a method of placing this concrete which would be satisfactory to the District Engineer, and we were just as diligent as we could be in working this out and placing the concrete lining as soon as possible. Now, in connection with that it developed it was not practicable, in our opinion, to use the pneumatic gun method, it was slow, it was bad concrete, it was objected to by the District Engineer. In good faith we went to another method, which at that time had not been fully developed, namely, this Pumpcrete. There were difficulties in connection with that in getting the proper power to operate that machine; there were difficulties in connection with getting permission of the Industrial Accident Commission for changes on this machine, the particular design of the machine had to be worked out with the Chain Belt Company, and we want to make a record and we want to show the diligence and efforts that the contractor put in to develop that as quickly as possible and get the concrete lining placed in a manner satisfactory to the District. That is the purpose of this testimony at this time.

Mr. Wittschen: I think it is obvious from the gas encountered [1303] in the tunnel that the Industrial Accident Commission would not permit electrically-driven motors.

(Testimony of Thomas Moore Price.)

The Court: That is obvious to me.

Mr. Wittschen: It is also obvious the way this would have to be done, and all of those things I assume prudently would have been taken care of before you got to that place—that is argumentative, it is not binding on us how you did it; you were permitted to do it any way you pleased, as long as you complied with the specifications.

Mr. Marrin: Yes, but when we came up against a condition which required an entire change in the plan we were entitled to show the diligence with which we attempted to proceed with the contract.

The Court: What, for example, has been developed in regard to delay on account of pouring this concrete? I do not recall that there has been any delay other than what Larson testified to, in relation to the difficulties. Was there any written communication?

Mr. Wittschen: No.

Mr. Marrin: We advised them of these changes.

Mr. Wittschen: That you were objecting to delay.

Mr. Marrin: Objections to delay on account of the concrete?

The Court: Yes.

Mr. Wittschen: How did you put the first 110 feet of concrete in?

Mr. Marrin: We put that in accordance with the pneumatic method, and Mr. Price stated he made a concession there which would not be made for the

(Testimony of Thomas Moore Price.)

rest of the tunnel, it would have to be changed, and the engineer objected to the concrete, and we were trying to comply with his objection.

Mr. Wittschen: He merely objected to your method of laying. He did not object to the apparatus. [1304]

Mr. Marrin: He required a method, and it our opinion that was wholly impracticable to lay the concrete.

The Court: What is before the Court now?

Mr. Wittschen: I understand it could have been done with a Hackley gun. It was laid in the Sunset tunnel that way, with a Hackley gun.

Mr. Marrin: Was it laid horizontally?

Mr. Wittschen: In Twin Peaks, so I am told. I was not there. I was advised of that fact. I cannot tell you about the other tunnels, because I don't know.

The Court: Let us proceed. I think during the recess we had better work out an understanding so that both sides will be protected, and I will give you my views if it may be helpful. Proceed.

A. May I have the question?

(Question read by the reporter.)

A. Yes.

Mr. Marrin: Q. Over what period of time, Mr. Price?

A. Over the period of time from the latter part of November, 1934 up through June, 1935, approximately.

(Testimony of Thomas Moore Price.)

Q. Were there any problems in connection with the use of the Pumpcrete that had to be worked out in addition to the power?

Mr. Wittschen: The same objection, on all of the grounds stated.

The Court: The objection will be overruled.

Mr. Wittschen: Exception.

A. Yes, there were two problems connected with the power; the Industrial Accident Commission would not permit the use of motors, ordinary motors in the tunnel, and I had evolved a plan about the first week in April of installing motors in a steel box and feeding them with compressed air in order to keep the pressure in the place where the motors operated at a higher pressure than the tunnel [1305] air, so that the explosive mixture, if there were any in the tunnel, would not get into where the motors were and cause an explosion.

Q. It has been testified here, and I think you testified here, that excavation was resumed in December, 1934?

A. Yes, excavation on the core in the concrete section.

Q. Were you able immediately at the time of resumption of excavation to determine the type of concrete equipment which should be used in concreting the tunnel? A. No.

Q. Why not?

Mr. Wittschen: Objected to as immaterial, and on all of the grounds previously stated.

The Court: Overruled.

(Testimony of Thomas Moore Price.)

Mr. Wittschen: Exception.

A. It was impossible to determine it because we could not determine what kind of forms we could use, or how our equipment had to be placed; it might be necessary for us to continue on with the drift method and build the forms in place, leaving the core in place until the tunnel had been concreted, and then remove them. On the other hand, if we were able to open up the tunnel and timber it, and timber it so that it would hold, excavating the core, it would be possible to build the steel forms which could be moved into the tunnel so that concrete could be placed in them in the most economical way that it could be placed, and that had to be determined; it was necessary to see if we could open up the tunnel and hold it open for a specific distance to perform that operation before the plan could be determined.

Q. How much of the ground would have to be opened up before you could determine that?

A. Approximately 300 feet.

Q. When was that amount of ground opened up in the tunnel? [1306]

A. Approximately around April 1, 1935.

Q. When was the Pumpcrete ordered?

Mr. Wittschen: Objected to as immaterial, and on all of the grounds heretofore stated.

The Court: You may answer.

Mr. Wittschen: Exception.

A. The Pumpcrete was ordered after I received permission from the Industrial Accident Commis-

(Testimony of Thomas Moore Price.)

sion at a hearing before Mr. Fry and his assistant in San Francisco permitting the use of slip ring motors.

Mr. Wittschen: I object to that statement.

Mr. Marrin: Q. I just asked you about the date on which you ordered the Pumpcrete.

A. Approximately April 12, on or about that date.

Mr. Wittschen: 1935? A. Yes.

Mr. Marrin: Q. When were the forms ordered for the tunnel?

A. The forms were first ordered on—bids were asked on February 28th.

Q. Of what year? A. 1935.

Mr. Tinning: I submit the answer should go out as not responsive. The question was when they were ordered.

The Court: When were they ordered?

Mr. Marrin: When were they ordered?

A. The forms for placing the concrete in the tunnel, April 13, 1935.

Q. And when was the Pumpcrete delivered to the work?

A. On or about June 20 or 21, 1935.

Q. When were the forms delivered to the work, Mr. Price?

A. The forms were delivered about the first week in July, I believe.

Q. 1935?

A. 1935. That is the first of the forms. We ordered two sets.

(Testimony of Thomas Moore Price.)

Mr. Marrin: I have here a copy of a letter from T. M. Price [1307] to Wallace B. Boggs, dated February 9, 1935, to which is attached two drawings. Will it be stipulated that was sent and received by Mr. Boggs?

Mr. Tinning: Yes.

Mr. Marrin: I would like to offer that in evidence.

Mr. Tinning: It was sent by Mr. Price and received by Mr. Boggs.

Mr. Marrin: That is right.

Mr. Wittschen: In view of the fact that we have admitted all correspondence we won't object to that.

(The letter was marked "Plaintiff's Exhibit 62.")

[Set forth in the Book of Exhibits at page 281.]

Q. Attached to that, Mr. Price, are two drawings. Will you explain what those drawings show?

A. The drawing numbered A2-7 shows the concrete plant that was used inside of the tunnel in lining the tunnel.

Mr. Tinning: Q. Mr. Price, can you tell me where you got the marking of A2-7? Isn't that something that you have made up in your exhibit? The number on this seems to be DWG No. 13.

A. You are right, there is DWG No. 13 underneath.

Q. You are calling a number that you put on in preparing your exhibits. I have a photostatic copy of that diagram that you furnished the district. It is dated January 31, 1935. A. Yes. [1308]

(Testimony of Thomas Moore Price.)

Mr. Marrin: Will you explain what that shows?

A. The drawing reading from right to left shows the agitator car on the ramp, which car was used in hauling the mixed concrete from the mixing plant located at the West Portal into the tunnel. It had power agitation and discharged into a machine which represents the Pumpcrete.

Q. Will you show that to the Court?

A. The whole apparatus is mounted on a car which operated on the same track as the excavated muck was hauled out of the tunnel on.

The Court: Where did I see a diagram of this before?

Mr. Tinning: In the April 2 letter that went in evidence.

Mr. Marrin: There is a difference here that I want to bring out.

A. The pipes are shown leading from the Pumpcrete into the concrete forms which are represented immediately to the left of the Pumpcrete, and the concrete forms are shown to be filled by means of chutes leading from ports in the pipe to these chutes; that is shown in cross section at the left-hand side of the drawing, where the tunnel concrete is shown and the pipe leading into it, the chutes leading into it from the pipe leading from the chute.

Mr. Tinning: The chutes went through the sides of the concrete form?

A. Yes. This is a pipe looking at the cross section.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Will you pass to the second drawing?

A. The second drawing, No. 16, dated February 10, 1935, illustrates the concrete forms which we originally planned to use, and which we planned to use at that time. This second drawing shows the concrete called the furring concrete, being poured integrally with the concrete lining.

Q. Will you explain what you mean by "furring concrete"?

A. Furring concrete is concrete that is placed, as I understand it, to level up indentations in the structure that may be placed in [1309] other concrete, but it is not particularly designed to support, to carry any strength. At this point about 7 feet above the bottom, on the right-hand side of the tunnel, there were ventilating flues approximately every 12 feet; these flues were constructed of light steel, supposed to be constructed of light steel, like sheet steel, and set in the concrete, and the spaces between them, about two inches on each side of them, were covered with concrete.

The Court: What was the purpose of that?

A. The purpose of that was to lead the fresh air from the ventilating duct up here down into the roadway section all along the tunnel so that fresh air would be in there.

Mr. Tinning: Q. The furring is like a coating of plaster in a room, it covers up the conduits and

(Testimony of Thomas Moore Price.)

air spaces and gives a smooth interior to the inside of the tunnel? A. Yes.

The Court: We will take a recess now until two o'clock.

(A recess was here taken until two o'clock p. m.)

[1310]

Afternoon Session

THOMAS MOORE PRICE,

Direct Examination (continued)

Mr. Marrin: Q. Mr. Price, just before the noon adjournment, you were explaining Exhibit 62, which is the letter from you to Mr. Boggs, enclosing and sending to him the two drawings which are part of that exhibit. Did Mr. Boggs make any statement to you, with respect to those drawings, when you submitted them to him?

Mr. Wittschen: We object to that as incompetent, irrelevant and immaterial, calling for a conversation which would not necessarily be binding upon the defendant, tending to prove no issue.

The Court: I will allow it subject to a motion to strike and over your objection.

Mr. Wittschen: Exception.

The Witness: A. No; not at the time I submitted them.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Did he, thereafter?

Mr. Wittschen: Same objection.

The Court: The same ruling.

Mr. Wittschen: Exception.

The Witness: A. Yes. Along in the middle of March, 1935, to the best of my recollection, Mr. Boggs told me that, while he would not stop us if we wished to proceed with the installation of the concrete lining with the furring concrete included in it, nevertheless he did seriously object to it, and would not recommend that we pour the furring concrete with the lining of the tunnel.

Mr. Marrin: Q. Did he state the reason for his objection?

Mr. Wittschen: Same objection.

The Witness: A. Yes.

The Court: Same ruling.

Mr. Wittschen: Exception. [1311]

Mr. Marrin: Q. State what he said.

Mr. Wittschen: Same objection.

The Court: Same ruling; and note an exception.

The Witness: A. He stated that, due to the ventilating flues which were of light—the metal flues leading the air from the upper chamber in the tunnel to the roadway section were constructed of light sheet metal, and the electrical conduits being constructed of a material that would break easily, there would be serious possibility of damage to them, by pouring the concrete around them, due to the hydrostatic pressure and due to misplacing them or disturbing them during the operation of pouring.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Did you do anything thereafter to meet his objection? A. Yes.

Mr. Wittschen: Same objection on all the grounds heretofore stated.

The Court: The same ruling.

Mr. Marrin: Q. What did you do?

A. We redesigned the forms.

Q. I refer you to Defendant's Exhibit "II," which is a letter from you to Mr. Boggs, dated April 2, 1935, to which there is a drawing attached. Are these the forms, as you redesigned them to meet that objection? Is that a drawing of it?

A. Yes, this is.

Q. You sent that to Mr. Boggs on or about the date of the letter? A. Yes.

Q. Thereafter—I refer you now to Defendant's Exhibit "JJ",—which is a letter dated April 9, 1935, from Mr. Boggs to you, or to Six Companies of California, to your attention,—which has been read in evidence; and I will ask you: Does that contain his comments on the revised design which you submitted? A. Yes, it does.

Q. What did you do, after receiving the letter?

A. Why, the comments that were brought up there did not affect the basic design [1312] of the forms; so I ordered the forms immediately, believing that we could straighten out the points he brought up on the actual pouring conditions.

Q. And the forms, as ordered by you,—did they provide or did they not provide for pouring the furring concrete integral with the concrete lining?

(Testimony of Thomas Moore Price.)

A. They did not provide for it.

Q. In other words, you met the objections that Mr. Boggs made to your earlier design? A. Yes.

Mr. Marrin: I have here the original of a letter received from the Industrial Accident Commission, written by Fred L. Lowell, Supervising Engineer, Mining Section, of the Industrial Accident Commission, to Tom Price, General Manager of Six Companies of California, dated April 11, 1935; and I offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: May we look at it a moment?

Mr. Marrin: Surely.

Mr. Wittschen: We object to the introduction of this letter, on the ground it is incompetent, irrelevant and immaterial, and on the further ground that the contract provides that the Contractor would abide by all the safety rules of the Industrial Accident Commission.

Mr. Marrin: If your Honor please, this letter is a letter from the Industrial Accident Commission setting forth the regulations of the Commission with respect to the use of motors and power on the concrete; and we offer it.

The Court: I will allow it.

Mr. Wittschen: Exception.

(The letter was marked "Plaintiff's Exhibit No. 63.")

Mr. Marrin. This is a letter on the letterhead of the Industrial Accident Commission, dated April 11, 1935: [1313]

PLAINTIFF'S EXHIBIT No. 63

Industrial Accident Commission
State Building
San Francisco

April 11, 1935

Tom Price, General Manager,
Six Companies of California,
P. O. Box 120,
Berkeley, California

Subject: Concrete pump and flood lights in Low Level Broadway Tunnels.

Dear Sir:

Any "wound-rotor" or slip ring motors with their speed control equipment are to be enclosed in tight fitting boxes, and fresh dry air from the compressed air line is to be piped into these enclosures for ventilation. The starting devices for each of these two motors are to be so arranged that the motors cannot be started without first establishing compressed air ventilation.

Power lines and heavy-duty portable cable will supply 440 volt power from the transformers located outside of the tunnel to the concrete machine until it is approximately 1000 feet from the portal. The 440 volt cable may then supply power to step-up transformers (440 to 2300 volts), 1000 feet in from the portal where the power will then be stepped up to 2300 volts and carried to the next bank of transformers located approximately 2000 feet from the portal, where the voltage will be stepped down again (2300 to 440 volts) for the machine.

(Testimony of Thomas Moore Price.)

The transformers underground are to be located in the cross-cuts between the two tunnels. There must be a tight fitting door on both sides of the underground transformers with fresh dry air from the compressed air line ventilating the space between the doors and about the transformers.

The lights to be used on this machine shall be of the "vapor-proof" or "explosion-proof" type.

These lights and the power for the machine must be disconnected by switches located outside of the tunnel when blasting is done in the tunnel, and are not to be turned on after blasting until the fire boss has made a test of the tunnel air for explosive gas and found it to contain not more than ½ of one per cent methane gas in any part of the tunnel.

The vapor-proof flood lights exhibited at our office are approved for tunnel lighting between the portal and the flood lights now in use at the face subject to the same provisions for extinguishing them by a switch outside the tunnel when blasting is being done in the tunnels.

Yours very truly,

(Signed) FRED L. LOWELL
Supervising Engineer
Mining Section

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 63. Filed April 29, 1933. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Was that ruling made pursuant to a request made by you? A. Yes.

Q. Was that a modification of former rulings of the Commission, with reference to the use of electricity in the tunnels? A. It was.

Q. What were the former regulations?

A. That no electric wiring would be permitted in the tunnels.

Q. And this is the first permission you have to use electric motors or wiring in the tunnels?

A. I had received verbal permission the preceding day. This was a confirmation of it.

Mr. Marrin: I have here a letter from Six Companies of California to W. B. Boggs, dated July 1, 1935; and I offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: We object that on the ground it is incompetent, irrelevant and immaterial; that they were bound by the rulings of the Commission; and in no way binding upon the defendant.

The Court: Indicate, for the purpose of the record, the purpose of the offer.

Mr. Marrin: This is a letter transmitting to Mr. Boggs, at his request, a copy of the ruling of the Industrial Accident Commission.

The Court: I will allow it.

Mr. Wittschen: Exception.

(The letter was marked "Plaintiff's Exhibit No. 64.") [1315]

Mr. Marrin: This letter is dated July 1, 1935, and is addressed to Mr. W. B. Boggs, District Engineer, Joint Highway District No. 13, 1448 Webster Street, Oakland, California; and reads as follows:

PLAINTIFF'S EXHIBIT No. 64

July 1, 1935

Mr. W. B. Boggs,
District Engineer,
Joint Highway District No. 13,
1448 Webster St.,
Oakland, Calif.

Dear Sir:

As per your verbal request of today, we are enclosing copy of letter from the Industrial Accident Commission, covering the use of motors in tunnels.

Very truly yours,
SIX COMPANIES
OF CALIFORNIA
By T. M. PRICE,
Project Manager

P:C
Enc.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 64. Filed April 29, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

Mr. Marrin: Q. This letter refers to a verbal request by Mr. Boggs, Mr. Price. What was that request?

(Testimony of Thomas Moore Price.)

Mr. Wittschen: Same objection as heretofore made.

The Court: Overruled.

Mr. Wittschen: Exception.

The Witness: A. He requested me to give him my authority for installing the motor on the Pumpcrete, in that manner.

Mr. Marrin: Q. Is the letter which is referred to in here, from the Industrial Accident Commission, the same letter which has just been introduced as Plaintiff's Exhibit No. 63? A. Yes.

Q. When you sent to Mr. Boggs the copy of the ruling of the Industrial Accident Commission contained in Plaintiff's Exhibit No. 63, did he say anything to you with respect to it?

Mr. Wittschen: Objected to on the ground it is incompetent, irrelevant and immaterial. The matter of putting in concrete was entirely a matter for the Contractor and his obligation. It does not prove any issue in the case.

Mr. Marrin: We expect to show, your Honor, even at that date Mr. Boggs stated that he did not consider that the Contractor had sufficient authority to use these motors in the tunnels, and requested [1316] the Contractor to apply to the Industrial Accident Commission for further permission.

The Court: In accordance with the plans and specifications?

Mr. Marrin: What is that, your Honor?

The Court: Because of the plans and specifications?

(Testimony of Thomas Moore Price.)

Mr. Marrin: No; because of the ruling of the Industrial Accident Commission with respect to the use of electricity in the tunnels.

The Court: Read the question.

(Pending question read by the reporter.)

The Court: I will allow it.

Mr. Wittschen: Exception.

The Witness: A. Yes; he stated to me that he did not consider that the ruling of the Industrial Accident Commission covered the situation, or the conditions which we were using on the Pumpcrete, with respect to induction motors.

Mr. Marrin: Now, I have here a copy of a letter from Six Companies of California, dated July 2, 1935, to the Industrial Accident Commission, requesting a further ruling with respect to the motors; and I will offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: We make the same objection on all grounds heretofore stated.

The Court: Objection overruled.

Mr. Wittschen: Exception.

(The letter was marked "Plaintiff's Exhibit No. 65.")

Mr. Marrin: This letter is dated July 2, 1935, and reads as follows: [1317]

(Testimony of Thomas Moore Price.)

PLAINTIFF'S EXHIBIT No. 65

July 2, 1935

Industrial Accident Commission,
State Building,
San Francisco, Calif.

Gentlemen:

In reviewing your letter of April 11, it apparently is not clear as to whether we have permission or not, to operate induction type motors, which would not be enclosed in tight fitting boxes and fed with compressed air.

In order to clear this up, we herewith respectfully request permission to operate small motors of this type, which, according to the manufacturers, are absolutely spark proof, there being no moving electrical connections. In connection with the pumping and hauling equipment, for the concrete, we plan to have two motors of this type on the pump rig itself, as well as one rotor, or slip-ring, motor, which will be protected as per your letter. We would also have one motor on each of the hauling agitators for concrete, and of which one at a time will be located at the pumping rig.

We would also like to work a 3-HP induction motor on a small conveyor belt, immediately adjacent to the pumping rig, to load muck from the concrete excavation, immediately ahead of the forms.

(Testimony of Thomas Moore Price.)

We thought this matter had been covered, and have made our plans accordingly; therefore, any consideration at your earliest convenience, on this, would be appreciated.

Very truly yours,
SIX COMPANIES
OF CALIFORNIA
By T. M. PRICE,
Project Manager.

P:C

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plif's Ex. No. 65. Filed April 29, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

Mr. Tinning: Mr. Marrin, perhaps it would save delay later on, in cross-examination: What was the date the Pumpcrete arrived on the job? Would you give us that?

Mr. Marrin: Q. Could you state the date the Pumpcrete arrived on the work, Mr. Price?

A. On or about June 21, to my best recollection.

Mr. Marrin: June 1st of—— A. June 21st.

Q. Of 1935? A. Of 1935. [1313]

Mr. Marrin: I have here a letter from the Industrial Accident Commission, addressed to T. M. Price, dated July 10, 1935; and I offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: Would you wait until we read it?

(Testimony of Thomas Moore Price.)

Mr. Marrin: Surely.

Mr. Wittschen: We make the same objection as heretofore stated: that, by their contract, the plaintiff was bound to conform to the rulings of the Industrial Accident Commission; and the introduction of these letters tends to prove no issue in the case, and is entirely incompetent, irrelevant and immaterial.

The Court: Indicate, for the purpose of the record, the purpose of this line of testimony and the purpose of the offer.

Mr. Marrin: This letter, if the Court please, is——

The Court: I am not limiting it to that letter—this line of testimony, namely, the compliance with the Industrial Accident Commission ruling.

Mr. Marrin: This line of testimony is offered for the purpose of showing that the type of concrete equipment which the plaintiff was attempting to perfect here, in order to place the concrete lining, was required to be driven by a certain type of power; and that, under the regulations in effect by the Industrial Accident Commission governing safety in the tunnels at the time the Contractor commenced to work out this design of equipment, the use of electricity for electric motors in the tunnels was prohibited; and it was necessary for the Contractor to apply to the Industrial Accident Commission and get its permission for a modifica-

(Testimony of Thomas Moore Price.)

tion of those regulations, before either the District or the Commission would permit the use of the equipment; and that that was done.

Mr. Wittschen: I call attention to the fact that all of that is in the specifications. It requires the Contractor to abide by the rulings of the Commission; and that it, the plaintiff, chose the [1319] equipment that it would use, could have laid the concrete in any way it pleased, and that it is entirely immaterial as tending to establish any issue in the case; on the further ground, it is not mentioned as a basis for rescission.

Mr. Marrin: I would like to add that this is offered for the purpose of showing that the Contractor was unavoidably delayed in working out this problem for placing the concrete lining.

The Court: I will allow it subject to a motion to strike and over the objection of counsel.

Mr. Wittschen: Exception.

(The letter was marked "Plaintiff's Exhibit No. 66.")

Mr. Marrin: This letter is on the letterhead of the Industrial Accident Commission, State Building, San Francisco, dated July 10, 1935, and is addressed to Mr. T. M. Price, Manager, Six Company of California, Post Office Box 120, Berkeley, California; and reads as follows: [1320]

(Testimony of Thomas Moore Price.)

PLAINTIFF'S EXHIBIT No. 66

Industrial Accident Commission
State Building
San Francisco

July 10, 1935

Mr. T. M. Price,
Manager, Six Companies of California,
P. O. Box 120,
Berkeley, California.

Dear Sir:

Your letter of June 15, 1935, addressed to the Industrial Accident Commission and also your letter of June 26, 1935, also addressed to the Commission, both of which request exemption from the safety order pertaining to the lights to be used in the east tunnels, were duly received and considered and referred to this department for consideration and answer.

Your letter of July addressed to the Commission requesting exemption from the safety order pertaining to electric equipment particularly that part pertaining to permissible electric motors, was also received and considered and referred to this department for consideration and answer.

In regard to the request for exemption from permissible lights in the east tunnels, we wish to say that:

1. The Benjamin vapor-proof lamp may be

(Testimony of Thomas Moore Price.)

installed 10 feet back of the mucking machine and that any other lights used in the tunnel shall be of this type of lamp or else of the vapor-proof type formerly used at the Hetch Hetchy tunnels.

2. That no other type of lamp globes shall be used in any of the east tunnels and no lights except approved cap lamps shall be used between the floodlight 10 feet back of the mucking machine and the face of the tunnels.

3. That all lamp sockets and lamp connections shall be kept in good repair at all times and that it shall be the duty of the fire boss to examine all light connections and if any are found defective, it shall be his duty to report it to some proper electrician who shall repair it immediately.

4. If these lights are not kept in good repair and in safe condition at all times, then all light wires and globes may be ordered out of the tunnels and only permissible cap lamps shall be used exclusively in these tunnels.

In regard to the request for exemption from Special Safety Order pertaining to stationary electric motors we wish to say that:

1. The use of two induction motors on the concrete pump,—one induction motor on each of the two concrete agitators and one induction motor for driving a short conveyor belt in connection with excavation for the concrete work

(Testimony of Thomas Moore Price.)

is approved as long as the motors are used for this particular purpose but not for any other purpose without permission from the Commission. These motors shall be kept in the concreted section or within a few feet of it.

After the meeting in your office on July 8, 1935, and subsequent inspection of the project, we have the following suggestions to make which we think will have a tendency to improve safety conditions and health conditions as well.

It appeared that too much stress was being made of the fact that installations of equipment on the job was only temporary and therefore not necessary to devote too much care in protection of it. Equipment must be completely guarded before it is put into operation. No work shall be started until safe conditions prevail.

There should be close co-operation between the management, superintendents, walkers, shift bosses and the safety engineer and fire bosses.

The superintendents, walkers and shift bosses must be more diligent in order to detect and correct unsafe conditions. There seemed to be a tendency to install electric wires in the east tunnel hurriedly without due care for safety. These could have been installed correctly at first and thereby have saved the labor of hav-

(Testimony of Thomas Moore Price.)

ing to change them later, and also the criticism of putting in unsafe equipment.

It is recommended that the change rooms at the east end and at the west end be enlarged to provide sufficient showers for all men who desire to use them, also that ample arrangements be made so that all men can hang their working clothes in an orderly and sanitary manner so that they may dry properly.

Very truly yours,
(Signed) F. L. LOWELL
C.H.F.
FRED L. LOWELL
Supervising Engineer
Mining Section.

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Mr. Tinning: Mr. Marrin, perhaps we can clear this up. I notice in this letter of July 10th it refers to the Six Companies' letter of June 15th and the letter of June 26th. There are two letters omitted.

Mr. Marrin: I am not sure of that. Do you recall, Mr. Price?

A. No, I do not just at the moment.

Mr. Tinning: We suggest you make a note of it and you have them for cross-examination.

(Testimony of Thomas Moore Price.)

Mr. Marrin: All right, we will have them. I have here a letter from Wallace B. Boggs to Six Companies of California, dated February 13, 1935, which I would like to offer in evidence as Plaintiff's Exhibit next in order.

(The letter is marked "Plaintiff's Exhibit 67.")

This letter is on the letterhead of Joint Highway District No. 13 of the State of California, Oakland, Calif., February 13, 1935.

PLAINTIFF'S EXHIBIT NO. 67

Joint Highway District No. 13
of the
State of California

Oakland, Calif.
February 13, 1935

File: Broadway Tunnel
Schedule

Six Companies of California,
Field Office,
Post Office Box 120,
Berkeley, California

Dear Sir: Attention of Mr. T. M. Price, Project Manager

I am in receipt of copy of your revised construction schedule.

My communication of February 5 requested that this schedule be submitted in triplicate.

(Testimony of Thomas Moore Price.)

Will you kindly furnish me with two additional copies at your earliest convenience?

Yours very truly,

(Signed) WALLACE B. BOGGS

District Engineer

WBB/VE

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If your Honor please, the construction schedule was placed in evidence by the defendant as Defendant's Exhibit O.

Q. Mr. Price, other than that letter did Mr. Boggs ever make any [1323] comment to you with reference to this construction schedule?

Mr. Wittschen: Objected to as immaterial, irrelevant, and incompetent, and not proving any issue in this case.

Mr. Marrin: I desire to show, if your Honor please, that this construction schedule was presented to the District Engineer and he never made any objection to the schedule.

Mr. Wittschen: The specifications expressly provide that the District Engineer is not the monitor or guardian of the contractor, and he does not have to object to everything that is done, and I object that it does not tend to prove any issue in this case whether he commented or not.

(Testimony of Thomas Moore Price.)

The Court: You want to prove he was silent?

Mr. Marrin: If your Honor please, our construction of the District Engineer's duty is somewhat different.

The Court: He was silent?

Mr. Marrin: He was silent and never said anything about it, and he was there as engineer for the owner in charge of the whole construction operation, and anything that was not going on properly on this job, or if the contractor's construction schedule was not proper, it was the duty of the District Engineer to make the objection and point those matters out to the contractor.

Mr. Wittschen: In the first place, the specifications expressly provide that the failure of the engineer shall not in any way relieve the contractor of his duty, and I repeat it was no part of the engineer's function to take the contractor by the hand and tell him what to do.

Mr. Marrin: We offer it for the purpose of showing that there was never any objection, except this letter of August 30, 1935, two days after the cave-in, by the District Engineer to any of the contractor's methods or construction schedule of operations. [1324]

The Court: I agree that there was no legal obligation on him. However, I will allow you to have a record on it.

Mr. Wittschen: Exception.

A. Not that I recall.

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Mr. Price, I draw your attention to Defendant's Exhibit O and will ask you to point out on there on what date that construction schedule states that the concrete lining will be commenced, that is, after the concreting of the west portal? A. On May 1, 1935.

The Court: Have we got that date on this report? A. Yes.

The Court: This rather confuses me in this, is there any doubt about when it started between counsel?

Mr. Wittschen: I think the point is it did not start until May, and he is trying to show now we did not object to it, but it pointed out that the contract would finish on time, and I think Mr. Marrin's desire is, if I may read his mind, to show we did not object, we were waiting for him to start.

Mr. Marrin: I simply want to show how much ground this construction schedule showed would be opened in the tunnel at the time the concrete lining was contemplated starting in accordance with this construction schedule which was submitted to the District in February preceding, and to which it made no objection.

The Court: How many feet would be open? What does the testimony already show in relation to that portion of the tunnel where Larson stopped?

Mr. Marrin: It shows there were about 800 or 900 feet in each tunnel which was open at the time of the cave-in of August 28th.

(Testimony of Thomas Moore Price.)

Mr. Tinning: Mr. Larson's testimony was that there was about 618 feet open in the south tunnel and 573 feet open in the north tunnel on April 30. [1325]

The Court: What is your thought?

Mr. Marrin: My thought is simply to show that according to this construction schedule it shows that——

The Court: Is this in evidence?

Mr. Marrin: Yes, it was put in evidence by the defendant.

The Court: Proceed.

A. This was a proposed construction schedule. It was made out with the information after January as planned, not accomplished. At that time the concrete is shown as starting on May 1, 1935 after the excavation for the sandstone section had been completed, practically completed. The sandstone section was estimated to start on November 1, 1934 and be completed on May 15, 1935, at which time the cherts formation would be started and completed in October, 1935, at which time the Orindan would be started and completed in March, 1936.

Mr. Wittschen: May I just ask a question to be sure I understand you? When you say completed, you mean excavation completed or concrete completed? A. The excavation.

Q. When was the concreting to be completed?

A. The concreting was to be started May 1 and continued to completion on April 25, 1936.

(Testimony of Thomas Moore Price.)

Q. Within the contract time? A. Yes.

Mr. Marrin: Q. How much of the tunnels would be excavated on May 1, 1935, at the time the concrete was contemplated to start?

A. Excluding the portal section, which was concreted approximately 650 or 660 feet.

Mr. Tinning: Let us not get confused. I think that Mr. Larson gave those actual distances, and that the distance was 618 feet, if I remember it, in the south tunnel, and 573 feet open on the north tunnel. [1326]

Mr. Marrin: That is actual excavation. I am talking of this proposed construction schedule, what it shows.

Mr. Tinning: I beg your pardon, I thought you were asking what was actually excavated.

Mr. Marrin: No, I am talking what the construction schedule showed, which was contemplated.

The Court: This is in evidence?

Mr. Marrin: Yes, the defendant put it in evidence.

Q. Mr. Price, when were concreting operations resumed in the tunnel in 1935 after the west portal had been concreted?

A. Why, footing concrete was started about the 1st of July or shortly, about the first week in July, 1935, and approximately at the same time in both tunnels; as I recall, the arch concrete was started in the south tunnel on or about July 19, and in the north tunnel on or about August 8.

(Testimony of Thomas Moore Price.)

Q. Was the Pumpcrete used in resuming pouring? A. Yes.

Q. Was any difficulty experienced in getting it into operation?

Mr. Wittschen: Objected to as immaterial, and on the grounds stated to a similar question.

The Court: The objection is overruled.

Mr. Wittschen: Exception.

A. Yes, there was some difficulty in the method of transferring the concrete from the Pumpcrete, itself, into the forms.

Mr. Marrin: Q. Was that satisfactorily solved? A. Yes, it was after a considerable time had elapsed with a lot of experimenting.

The Court: After a little educational program.

Mr. Marrin: Q. How much time did that take?

A. To the best of my recollection it took several pours, probably three or four weeks before we got it working in a manner that pouring was satisfactory to everyone. [1327]

Q. Did anything have to be done with the timbering in the tunnel preparatory to placing the concrete?

A. Yes; at the start of the concreting in each tunnel the timbers had intruded just east of the concrete portal section, had intruded two or three inches into the concrete. That is the first place we started after excavating the core of the portal concrete. Those timbers had to be trimmed in order to clear the specified distance of the concrete lining.

(Testimony of Thomas Moore Price.)

Q. For what distance did that trimming have to be done in the part of the tunnel that was opened?

A. As I recall it, for approximately four or five short pours in the south tunnel, and approximately three in the north tunnel. I desired to make short pours, 8 or 9 feet at that time, in order not to trim too much of the tunnel timber at any one time. As that was done the concrete in the next section would be poured, and so on, until the forms carried the section where the timbers had intruded.

Q. Do you mean that all of the timber that had to be trimmed was simply for a distance of four or five pours in the entire open excavation of the two tunnels?

A. Yes, that is true entirely in the south tunnel, to the best of my recollection up to the point in the tunnel about where the cherts formation began, about station 117, I believe. However, in the north tunnel there were two points, one about station 114 and one about station 116+70 or 75, where the timbers had intruded very shortly after they had been installed by Mr. Larson, and where he was forced to go back and reinforce timbers and put in additional timbers and brace them in order to keep them from coming in. At those points they had intruded several inches, up to six inches, into the concrete sections, but that movement occurred shortly after they had been installed and were watched carefully for a period of six months after they were [1328] installed and showed no more movement.

(Testimony of Thomas Moore Price.)

Q. Were those timbers at those points trimmed, or were they reset?

A. The timbers at the first point, about station 114, were the timbers which were being reset at the time of the August 28th cave-in.

Q. Will you describe briefly the operation of re-setting the timbers?

A. The timbers were reset—I should say that the only timbers that were being reset were the arch timbers; the post, the side wall post and the wall plate apparently were in good shape, and had not intruded.

Q. Would you mind just illustrating that briefly on the board, what you mean by that, so that it will be clear?

A. These are the side wall posts, and this is the wall plate, looking at the end. These are the segments which had intruded into the tunnel at the crown approximately 6 inches into the concrete area.

Q. Where you were re-timbering?

A. Where we were re-timbering; that extended over an area of approximately 25 or 30 feet, as I recall it, and we had started at—let us assume that is the section of the timbers that had been intruded; we started at the east end and worked back toward the west, resetting the timbers. The normal operation on that is to take out a small section. I will draw a short cross section, at any point like this, and assume that these are the two sets that are in-

(Testimony of Thomas Moore Price.)

truding into the concrete area, so that is the outside of the concrete line, and it is necessary to get these timbers back so that this point is outside of the concrete line. The method that we used was to take these timbers, take the lagging behind these timbers, which would represent a 2 by 12 or 3 by 12 timber in that position, take it out at this point, here, dig out behind, and get it so that it would look in a revised condition like this, loosening out the portion [1329] of the ground behind that post or lagging and blocking it with blocks off of the existing timbers which still intruded and proceed up accordingly all the way around until we had the lagging down and blocked to the existing sets which intruded. Then after that had been done all the way around, we placed a new set right there to hold that lagging, which set would extend from the wall plate around to a new post like that.

The Court: Q. What was the distance of that?

A. As I recall that is approximately 30 feet across there.

Q. Is it through that section that the cave-in occurred?

A. It is in that particular section that that particular cave-in occurred; we had started that work three or four days before in order to save time with the concreting, so that by the time the forms for concreting reached that point the timbers would be back out of the concrete line and no delay would be suffered by reason of waiting to re-timber the section.

(Testimony of Thomas Moore Price.)

Mr. Tinning: Might I ask Mr. Price a question?

Q. How long, approximately, was each one of those segments, in yards or feet?

A. Six or seven feet, I should judge.

Q. There were seven of them, so that they would be 42 feet?

A. Possibly I misunderstood your question; around the arch there would be approximately 40 to 45 feet from this point, measured on the curve over to the wall plate.

Mr. Marrin: Q. How large was that lagging?

A. It was 2 by 12 or 3 by 12 in the arch, it was 3 by 12 sometimes, no regularity, at least 2 by 12 and sometimes 3 by 12.

Q. And the method of procedure was to take out one piece of lagging at a time?

A. Take out one piece of lagging at a time.

The Court: Q. At the bottom, or how?

A. Starting at the bottom and working toward the top. There is the segment inside, starting and taking that piece of lagging out and setting it [1330] back and blocking it to the set that was intruding in the concrete.

Q. This was exposed for how long?

A. It had been exposed approximately six or seven months.

Mr. Marrin: Q. This particular section of the timbering? A. This particular section.

The Court: I recall now, but at this point of the intrusion, the intrusion had occurred shortly after it was excavated?

(Testimony of Thomas Moore Price.)

A. Well, in two or three days after we had noticed the spring on the timbers and removed it, and Mr. Larson went back and braced it up.

Mr. Marrin: Q. At the time you reset the timbering in this section was the timbering moving in?

A. No. I did not quite finish my previous answer. We had almost completed the setting back of these timbers, as I recall it, when the cave-in occurred, we had already set some ten or twelve sets coming toward the west end of the portal, and only had two or three more to reset, to the best of my recollection, at the time the cave-in occurred.

Q. Is that the usual manner of resetting timbers?

A. That is my understanding of the usual manner. I have never seen them reset in any other way.

Q. Who had charge of the resetting of the timbers? A. Mr. Whitmire.

Q. Did you confer with him with respect to it?

A. Yes, I conferred with him, quite a bit about it, and we both collaborated on the men who were to do that work; we both felt that they should be experienced, skilled men, and we put the best men, the best crew on it we had; the operation was continued 24 hours a day on the basis of three shifts, and it took quite a crew of men, because the work was necessarily slow and tedious.

Q. Why didn't you trim the timbers at this point instead of resetting them?

(Testimony of Thomas Moore Price.)

A. For two reasons. First, it would have been [1331] unsafe to trim that much of the timber, and the second reason, because the concrete was going so slowly, because the engineer required us to hold the forms in place for 72 hours after pouring, before we could move them or shift them; this took almost five days to make a concrete pour, and if that had been maintained we would have lost about ten days going through that section where the timbers were down, if we had done it in short sections, whereas we could save that much if the timbers were out of the arch and we could have gone ahead.

Q. If I understand your answer, the setting back of the timbers rather than the trimming of them would have enabled you to make longer pours?

A. Yes.

Q. And would speed up the operation of concreting the tunnel? A. Yes.

Q. Did the tunnel cave in on August 28, 1935, Mr. Price? A. Yes.

Q. At about what station? I might ask first, which tunnel? A. The north tunnel.

Q. At about what station?

A. Well, I would say it was approximately between station 114 and 125, somewhere along in there, I don't know the exact station.

Q. From 114 to 125?

A. From 114 to 114+25.

Q. What operations were being carried on at that point at the time of the cave-in?

(Testimony of Thomas Moore Price.)

A. The timbers in the arch were being reset outside of the concrete line.

Q. Was the concrete pouring on that date?

A. Not at that particular point. It was pouring further west in the tunnel. As I recall it, it was about 100 feet back of them.

Q. What concrete had been poured between the time the Pumpcrete was put into operation in July, 1935 and the time of this cave-in?

A. Could I refer to my little book? You mean the concrete in the north tunnel?

Q. You might state it fully.

A. In the north [1332] tunnel the portal concreted section the concrete had been poured from station 112+53 to station 113+13.

The Court: What is that distance?

Mr. Tinning: That was 60 feet.

A. Approximately 60 feet. And in the south tunnel concrete had been poured from station 112+45 to station 113+61, a distance of 116 feet.

Q. Had any arrangements been made at that time for pouring footing concrete?

A. Yes, footing concrete had been started earlier than the arch concrete, and preceded it by both distance and time.

Q. Why did you pour the footing concrete first?

A. For two reasons, I might say, in order to make a foundation to set the forms against so that the forms would be in good alignment, and particularly, shortly after the August 21st cessation of

(Testimony of Thomas Moore Price.)

excavation I determined to pour all of the footings in the tunnel that was then open, with the belief that 5 feet of concrete, 2½ to 3 feet high, located at the bottom of the plumb posts would shorten the height of the plumb posts and would stop the breaking; that was the principal trouble, the plumb posts broke, and if the concrete had been placed at the time it would strengthen the whole tunnel and stop the breaking; with that in mind I put the heading crews and crews that had been working pouring the tunnel after August 21, I moved them over to get these concrete footings in as fast as possible; that could be poured quickly without any forms, and we just dumped the concrete, as I remember, from the mixing plant to the forms, and that I felt could be done in a few days, and would strengthen the whole tunnel.

Q. Was the footing concrete poured at the point of the cave-in before the cave-in occurred?

A. Yes, it was.

Q. Were the plumb posts which you mentioned breaking in that part of the tunnel?

A. No, the plumb posts were breaking in the cherts formation, not in the sandstone. [1333]

Q. Were you at the tunnel at the time of the cave-in? A. No, I was not.

Q. What time of the day did it occur?

A. It was in the evening, somewhere around seven o'clock, I forget the exact time.

Q. How long had it been previous to that that you had been at the tunnel?

(Testimony of Thomas Moore Price.)

A. I do not recall exactly; to the best of my recollection I left the tunnel early that afternoon, around 3 or 4 o'clock; in any event, I had not arrived at home when I heard the report of the cave-in, but had arrived very shortly afterward.

Q. You arrived at the scene of the cave-in shortly afterward? A. Yes, about 7:30.

Q. Did you observe the cave-in? A. Yes.

The Court: Describe it in your own way, so that I will get some idea about the cave-in.

A. When I arrived at the job I found, naturally, a lot of excitement, the men had all come out of the tunnel and were down at the office. There was a statement that some men had been caught.

Q. The matter I had in mind was the cave-in, itself.

A. I think a longitudinal section of it would describe it better for you. A portion about 50 feet in the arch had fallen into the tunnel and filled it up, approximately like that.

Q. 50 feet?

A. 50 feet of this portion of the tunnel had come in and filled this area, here, and had worked this way to the top of the ground, and the top of the ground above the tunnel sunk about ten or fifteen feet.

Q. About what distance was it to the top of the ground?

A. I would estimate around 75 feet, maybe 100 feet. The proportions here are bad, but this had fallen down into the tunnel and blocked it.

(Testimony of Thomas Moore Price.)

Q. That is sufficient for my purpose. [1334]

Mr. Marrin: Q. Mr. Price, I show you a picture which has a legend on it,

"August 28, 1935 cave-in—Taken at point at top of arch on west end immediately thereafter. Note arch cap pushed down but not broken—also remains of catwalk."

Is that a true reproduction of the part of the tunnel at the time of the cave-in? A. Yes.

Q. Would you show it to his Honor? That was taken about what time—Will you explain that?

A. That is looking into the tunnel, your Honor.

The Court: Q. From what point?

A. From the west end, looking in. Assuming this is the portal out here, that picture is taken looking at that point right there (indicating on blackboard.)

Mr. Tinning: Looking from the west end at the top of the—

A. Yes, these are the timber sets. This is looking—

The Court: I cannot locate myself.

The Witness: Here is the top of the tunnel.

The Court: Q. The top? A. Yes.

Mr. Tinning: Your Honor, this would be just about where the camera was standing—somewhere about here (indicating).

The Court: I see.

Mr. Tinning: And pointing in toward the pile of earth.

(Testimony of Thomas Moore Price.)

The Witness: That is the same approximate line there; you are looking at those two timbers, your Honor.

The Court: I see.

Q. What is the size of these timbers?

A. Those are either 2 by 12's or 3 by 12's.

Mr. Tinning: Down here. These are 12 by 12, down here?

The Witness: Yes. This is the remains of the catwalk that was constructed throughout the tunnel, hanging from the ceiling like this, with a railing for the men to inspect the timbers up in [1335] the arch.

Mr. Marrin: I will offer that in evidence.

Mr. Tinning: I wonder if we could save some time, if you are going to put them all in, by putting them in as one exhibit?

Mr. Marrin: Yes; I will put them in as one exhibit. I think that might be better.

Q. I will show you another photograph, which has the legend on it:

> "August 28, 1935 cave-in—Taken about two hours later. Upper cross timbers are the start of the bulkhead—lower piled timbers are remains of staging on which men were working and catwalk."

Is that a true reproduction of the conditions at the time stated on the picture?

Mr. Tinning: Where was it taken from?

(Testimony of Thomas Moore Price.)

Mr. Marrin: Q. Will you explain where it was taken from?

A. It is taken again from the west end, looking into the cave-in. It shows the cross timbers; shows the timber bulkhead that was being constructed, and particularly these timbers in here.

Mr. Tinning: That was something that was put in after? A. After the cave-in.

Q. As part of the recovery work? A. Yes.

Mr. Marrin: Q. That bulkhead was constructed immediately afterward?

A. Immediately after the cave-in, yes, on each end.

Mr. Tinning: On that designation, the photograph shows, "Lower piled timbers"—That means the timbers down on the floor of the tunnel, as they dropped off the ceiling?

A. Yes; the remains of that catwalk and so forth.

Mr. Marrin: Q. I show you another picture, dated "August 28, 1935 cave-in—Showing start of sidewall drift to recover bodies." Will you explain that?

A. That was the beginning of that drift which was driven at this point through the muck,—the muck that caused the cave-in. [1336]

Mr. Tinning: The witness indicates two floor drifts, one at grade on each side of the tunnel, that is driven in, and that shows—

(Testimony of Thomas Moore Price.)

A. That particular drift is the—

Mr. Tinning: —that shows it in longitude.

A. It would be like this; starts there, and goes in like this.

Mr. Marrin: Q. This next photograph: "Cave-in of August 28, 1935—Showing hand driving of recovery drifts,"—what does that show?

A. That is a picture taken inside the drift after we got in a ways, and shows the spiling and men working.

Mr. Tinning: When it says "Cave-in of August 28—" that does not mean the photograph was taken on the 28th; it is taken at some later date?

A. Taken two or three days later. The bodies were recovered approximately September 3rd, I believe, and this work was some time prior to that.

Mr. Marrin: Q. This next photograph, "August 28, 1935 cave-in—Showing completed recovery drift, south side. Note concrete footing on lower right with reinforcing steel bent over—original tunnel posts on right,"—that is a picture of the recovery drift after it was completed, was it not?

The Court: You said there was about 50 feet of this?

The Witness: Your Honor, there was about 50 feet, as I recall it, in the arch; but the material spread out.

The Court: Oh, I see.

(Testimony of Thomas Moore Price.)

Mr. Marrin: The next photograph has a legend, "Cave-in of August 28,—Showing where cave-in broke surface of ground."

Q. What does that represent, Mr. Price?

A. That is a picture of the ground surface at the point where the cave-in material reached here, and where the normal ground sank down 10 or 15 feet.

Mr. Tinning: Made a pit in the surface?

A. Made a pit in the surface. [1337]

Q. A cone? A. Round.

The Court: Q. That was taken where?

A. That was taken from the surface, above the tunnel.

Mr. Marrin: We will offer all those as plaintiff's exhibit next in order.

(The six photographs were marked "Plaintiff's Exhibit No. 68.")

[Set forth in the Book of Exhibits at page 281.]

The Court: We will take a recess for a few minutes.

(Recess)

Mr. Marrin: I have here a letter from C. H. Fry, Superintendent of Safety, Industrial Accident Commission of the State of California, to Six Companies, dated September 1, 1935; and I offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: We object to that as incompetent, irrelevant and immaterial, not tending to prove any issue in the case, and on the further ground

(Testimony of Thomas Moore Price.)

that the Contractor agreed to be bound by the safety rulings of the Industrial Accident Commission.

The Court: Objection overruled.

Mr. Wittscben: Exception.

(The letter was marked "Plaintiff's Exhibit No. 69.")

Mr. Marrin: This letter reads as follows:

PLAINTIFF'S EXHIBIT NO. 69

Oakland, California,
September 1, 1935.

Six Companies of California,
Post Office Box 120,
Berkeley, California.
Attention Mr. T. M. Price, Project Manager

Gentlemen:

After conference this morning, with Mr. Wallace B. Boggs, District Engineer; and Messrs. Lippincott and Van Ormond, Consulting Engineers for Joint Highway District No. 13; it was the unanimous opinion that there should be another crosscut driven between the upgrade and downgrade tunnels, as near the face of the right-hand drift in the north tunnel as is practicable.

This work is to start at once, and be carried through as rapidly as possible, in order that there may be an emergency exit beyond the

(Testimony of Thomas Moore Price.)

present one, which is now at station 118+30 in the upgrade tunnel.

Yours very truly,

(Signed) C. H. FRY,
Superintendent of Safety,
Industrial Accident Commission of the State of California.

copy to Mr. Boggs

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 69. Filed April 29, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.[1338]

The Court: What is the history of the first drift that went in there?

Mr. Tinning: There were three adits in this tunnel, under the specifications, spaced about one-third—spaced so they divided the tunnel into four; and when this accident occurred, the Industrial Accident Commission asked that an emergency drift be put through; and it was; and it was later substituted for one of the regular adits.

Mr. Wittschen: It should be brought out that it added no additional work; it merely took the place—

Mr. Marrin: Well, Mr. Wittschen, you can bring that out on your cross examination.

The Court: Well, I developed this; I just wanted to follow it.

(Testimony of Thomas Moore Price.)

Mr. Wittschen: Don't you want to clear that up?

Mr. Marrin: Yes; I am going to ask him some questions about it.

Q. This adit that was ordered was a cross-tunnel,—a small tunnel between the two larger tunnels, Mr. Price? A. Yes.

Q. This cave-in did not extend back to the face of the tunnel, did it? A. No.

Q. And there was plenty of room to drive the cross-adit between the two tunnels back of the cave-in? A. Yes—Oh, yes.

Q. And was that adit driven? A. Yes.

Mr. Wittschen: Mr. Marrin, to clear that up—this is a good [1339] place; but, if you object, I won't press it—There was already an adit back of the cave-in; so this was just one further on to make two?

Mr. Marrin: Yes; there was one adit already driven back of the cave-in.

Mr. Wittschen: As part of the plans and specifications; and the second one was merely put in another place. There had been provision for it, but they had not got up to it?

Mr. Marrin: Yes.

Mr. Tinning: And the first adit was the one through which the men escaped when the slide occurred,—the men who were working on the face.

Mr. Marrin: That is correct, Mr. Tinning—the men who were back of the cave-in escaped through that adit, or got out.

(Testimony of Thomas Moore Price.)

I have a letter here, dated September 2, 1935, from C. H. Fry, Superintendent of Safety, Industrial Accident Commission of the State of California, addressed to Six Companies of California; and I offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: To which I make the same objection that was made to the preceding exhibit.

The Court: Same ruling.

Mr. Wittschen: Kindly note an exception; and I don't think I took an exception to the other ruling. Will you note an exception to that ruling, please?

(The letter was marked "Plaintiff's Exhibit No. 70.")

Mr. Marrin: This letter reads as follows:

PLAINTIFF'S EXHIBIT NO. 70

Oakland, Calif.,
September 2, 1935.

Six Companies of California,
Post Office Box 120,
Berkeley, Calif.

Attention Mr. T. M. Price, Project Manager

Gentlemen:

I have before me a copy of a letter dated September 1, 1935, from Six Companies of California, by T. M. Price, Project Manager, addressed to Mr. Wallace B. Boggs, District Engineer, Joint Highway District No. 13, 1448 Webster Street, Oakland, California, which

(Testimony of Thomas Moore Price.)

concerns certain changes in the concreting of the unlined portions of the excavated tunnels.

The plan as outlined will permit of concreting operations in much of the unlined portions of the tunnel without weakening the present timbering by trimming to present specifications.

This plan, or some other plan approved by the consulting engineers, which will give the same result, seems not only desirable but necessary.

In connection with the concreting operations or with repair operations, where removal of the arch segments or the posts is necessary, temporary supports, perhaps square sets, shall be provided in order that the removal of the segments or posts shall not throw undue stresses on the adjacent timbering.

The plan proposed is approved subject to the approval of the consulting engineers of the District and Six Companies of California.

Other plans, if any, will be given consideration.

Sincerely yours,

(Signed) C. H. FRY,
Superintendent of Safety,
Industrial Accident Commission of the State of California.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 70. Filed April 29, 1938. Walter B. Maling, Clerk. By. J. A. Schaertzer, Deputy Clerk. [1340]

(Testimony of Thomas Moore Price.)

Q. Prior to writing that letter, had Mr. Fry given you any orders with respect to the timbers in the tunnel?

Mr. Wittschen: Objected to as incompetent, irrelevant and immaterial, and not tending to prove any issue, and not binding on the District; and in order merely to acquaint your Honor of what has gone before: you will understand when this order was given, permitting the section to be dropped 10 inches, the Contractor agreed he would do that without any extra expense; in other words, [1341] it was a concession upon the part of the District to permit it; so it does not prove anything in the case.

Mr. Marrin: The defendants, themselves, on cross examination of Mr. S. D. Bechtel, introduced in this case all the orders from the Industrial Accident Commission in respect to the modified arch, and went into this to a considerable extent. We desire to make the record on that subject complete; and we desire to show all of the orders, both verbal and written, issued by the Commission, in connection with this matter.

Mr. Wittschen: The point of my objection is this: Counsel, himself, stated the order of the Commission which we introduced and which was the order signed by Mr. Reardon and Mr. MacDonald is the ultimate fact. All these letters that led up to the order don't prove anything.

Mr. Marrin: We propose to show that, immediately following the cave-in, Mr. Fry, Superin-

(Testimony of Thomas Moore Price.)

tendent of Safety, ordered this plaintiff not to remove or reset or trim any of the timbers in the tunnel.

The Court: He was prompted, in doing that, by this disaster, I take it.

Mr. Marrin: Yes, your Honor.

The Court: I will allow it.

Mr. Wittschen: Exception.

The Witness: May I have the question, please?

(Pending question read by the reporter.)

The Witness: A. Yes.

Mr. Marrin: Q. What were they?

Mr. Wittschen: Same objection.

The Court: Same ruling.

Mr. Wittschen: Exception. [1342]

The Witness: A. Mr. Fry was there, daily, for the few days after the cave-in; and he told me not to do anything at any time without first taking the matter up with him; and by anything, I mean any work in the tunnel without getting his approval; and in line with this, I gave him this copy—showed him this copy of the proposal for lowering the arch; and he told me at that time not to move or reset or trim any timbers in the tunnel at all until the whole thing had been clarified, and some definite plan had been agreed upon by all the parties in question.

Mr. Marrin: Q. I show you Defendant's Exhibit "OO," Mr. Price, dated September 1, 1935. Is that the letter that you showed Mr. Fry, and to which he referred in his letter? A. Yes, sir.

(Testimony of Thomas Moore Price.)

Mr. Marrin: That letter has been read into evidence, if the Court please, and it is the letter which was introduced by the defendant and which the plaintiff wrote to Mr. Boggs and suggested a method of concreting the tunnels which would avoid the removal or trimming of any more timbers.

Q. Mr. Price, I might ask you what you did after sending the letter of September 1, 1935, which is Defendant's Exhibit "OO," to Mr. Boggs, stating or suggesting the modification of the arch to obviate the removal of timbers—what work was carried on after that?

Mr. Wittschen: They modified that by a letter two days later.

Mr. Marrin: I am asking what he did after he wrote a letter which has been introduced in evidence by you.

Mr. Wittschen: Yes.

The Witness: A. We continued to concrete in the south tunnel, where we were able to do so without trimming or touching or disturbing in any way the timbers.

Mr. Marrin: Q. There were parts of the tunnel in which you were carrying on the concreting operations without trimming or removing timber? [1343]

A. Yes; in the south tunnel, which had not been affected by the cave-in in the north tunnel. We were able to pour concrete up to something like the first cross-adit, about Station 118, I believe, without any timber interference. The timber in that section had not intruded.

(Testimony of Thomas Moore Price.)

Q. Did you take any action looking toward installing a modified arch in the tunnel?

A. Yes, we did. I did not take any action in consulting with the Engineer, because Mr. O. W. Petersen had been appointed by the Six Companies of California to conduct negotiations with the Engineer, and, on his advice—

Q. Mr. Price, defendants have introduced in evidence as their exhibit "RR" a letter dated September 5th, addressed to Six Companies of California, Field Office, Berkeley, California, attention Mr. T. M. Price, Project Manager, signed "Wallace B. Boggs," and it reads:

"Dear Sir:

"I am advised by you and Mr. O. W. Peterson, your engineer, that Six Companies of California, the contractor on the Broadway Tunnel Project, is planning to proceed with the pouring of concrete in tunnel bores using forms which will result in a permanent reinforced concrete tunnel lining which does not conform to the plans and specifications for the work.

"You are hereby ordered to cease and desist in any such procedure as the same is entirely without authorization by this District and is a direct violation of your contract with the District. You are further advised that such work must not be performed and all steps on your part to perform such work as you have indicated you intend to perform, should immedi-

(Testimony of Thomas Moore Price.)

ately cease if the work is now in progress, and that any concrete tunnel lining placed in accordance with your proposal will be rejected by the District and will be ordered removed.

"Yours very truly,

(Signed) WALLACE B. BOGGS,

District Engineer.

[1344]

What work were you doing that Mr. Boggs stopped by that letter?

A. Mr. Peterson advised me—

Mr. Wittschen: Pardon me. This does not call for any advice by Mr. Peterson.

The Witness: I was modifying the concrete forms, cutting them down, and starting to modify the concrete forms by cutting them down to a smaller size, so they would be all right on the modified section.

Mr. Marrin: Q. On receipt of that letter, did you stop that work? A. Yes.

Mr. Tinning: Mr. Marrin, let's see if we understand this. I think the situation there was that it was more than cutting down the forms. He notified the District that they were going to pour concrete in modified form at that time. Isn't that what you were actually planning to do—just to refresh your memory?

The Witness: No; that was not correct. It was quite a job to cut down those forms, and we took three or four days' time, with blow torches, getting

(Testimony of Thomas Moore Price.)

the forms out of the tunnel and getting them back in again; and it took several days to do that; and I attempted to start this work, with the hope the Engineer would not stop me.

Mr. Marrin: Q. When you received that letter, did you stop this work? A. I did.

Q. What did you do thereafter, Mr. Price, in connection with the work, from about the 5th of September to the 14th of September, 1935?

A. We did not do a great deal. We were at a loss to know what to do. We had been told by one authority we could not change the timbers, and we had been told by another that we had to change the timbers; and we shut down for a few days, to find out what the situation would develop into before we proceeded.

Mr. Marrin: I have here a copy of a letter from Six Companies of California, T. M. Price, Project Manager, to the Industrial [1345] Accident Commission, dated September 14, 1935; and I will offer that in evidence as plaintiff's exhibit next in order.

Mr. Wittschen: We make the same objection: that we made to all these letters between the plaintiff and the Industrial Accident Commission; we were not parties to them; and the plaintiff had agreed to abide by all safety orders, and it proves no issue in the case.

The Court: Did you get a copy of these letters?

Mr. Wittschen: I don't think so.

Mr. Marrin: This is a letter, if your Honor please, transmitting to the Commission a copy of

(Testimony of Thomas Moore Price.)

the letter "Defendant's Exhibit SS," which was introduced.

The Court: Did you have knowledge of this?

Mr. Wittschen: No.

Mr. Smith: We did not, your Honor.

The Court: You will have to connect up the proper foundation.

Mr. Tinning: If the Court please, that applies to several of the others.

The Court: Well, for some reason or other, I assumed—

Mr. Wittschen: They may have sent something—

The Court: —I assumed they did. They would have to have some knowledge of them, to be bound by them in some fashion.

Mr. Marrin: Well, when the plans and specifications were made, they were drawn by the defendant itself; the plaintiff was required to comply with the rules of the Industrial Accident Commission.

The Court: Yes.

Mr. Marrin: This is simply showing—It has been shown here, by the evidence, part of which has been introduced by the defendants themselves, that this matter was taken up with the Commission, and [1346] certain orders were issued; and this letter is simply for the purpose of showing that a copy of Defendant's Exhibit "SS" was sent to the Commission; and Defendant's Exhibit "SS" is the letter of September 14, 1935.

Mr. Wittschen: From whom?

(Testimony of Thomas Moore Price.)

Mr. Marrin: From T. M. Price to Mr. Wallace Boggs, District Engineer; and it read as follows:

"We desire to acknowledge receipt of your letter of the 5th instant.

"Six Companies of California suggested the alternative plan outlined in our letter dated September 1st for concreting the tunnels for the purpose of making the construction operations safer and minimizing the damages which would result from exactly following the plans and specifications.

"However, in view of the instructions contained in your letter, we shall proceed immediately to concrete the tunnels in strict compliance with the plans and specifications.

"By doing so we do not waive any of our rights or any claims which we now have, or may hereafter have, against the District and you are notified that we shall claim and hold the District responsible for all damages resulting from this procedure.

"Very truly yours,
SIX COMPANIES OF
CALIFORNIA,
By (signed) T. M. PRICE,
Project Manager."

The Court: I will allow that letter.

Mr. Wittschen: This letter is already in.

Mr. Marrin: That is a letter that is in, your Honor. This letter we are offering now is the letter

(Testimony of Thomas Moore Price.)

from Mr. Price, of the same date, transmitting to the Industrial Accident Commission a copy of the letter he wrote to Mr. Boggs.

The Court: I may clear up this situation; and this is subject [1347] to correction; the conduct and the action on the part of the Industrial Accident Commission, to enforce the law as they saw it, under the plans and specifications, the ultimate fact they did it cannot inure to the benefit of either side in this case, as I see it.

Mr. Marrin: Well, I think it can, your Honor.

The Court: Well, point it out.

Mr. Marrin: We take the position, if the Court please, that the accident in the tunnel was an unavoidable accident.

The Court: Unavoidable accident?

Mr. Marrin: That is right.

The Court: Now, let's see. Let's check as we go along. There were sections of this tunnel that indicated clearly what you would have to do after this unfortunate accident, weren't there?

Mr. Marrin: I am not sure I understand your Honor.

The Court: After this accident, you were under their rules, that, in substance and effect, that you must support this in another way—Is that true?

The Witness: We must do something that would be agreeable to all and accepted by all the parties concerned.

The Court: And the purpose of that was for safety, was it not?

(Testimony of Thomas Moore Price.)

The Witness: Yes, sir.

The Court: And the probabilities are: if, while they could not foresee what this unfortunate disaster was, probably if that had been done in the first place, the disaster would not have occurred?

The Witness: Possibly not.

The Court: It is well to analyze these situations, unless I get the wrong viewpoint.

Mr. Marrin: I don't think your Honor is clear on the point we are offering that letter on. [1348]

Mr. Wittschen: Well, what happened was this: It is a fact there was a request to permit the timbers to intrude there and we consented to it, and we got the consent of the United States Government, which was interested, but the present matter before the Court is on a little different situation. Mr. Boggs wrote a letter—Mr. Price wrote a letter to Mr. Boggs, that is Exhibit SS, in which he said they will proceed to do this in accordance with the plans and specifications, either trimming them or resetting them; he said, "We will proceed."

Now, the letter that counsel is now trying to introduce is a letter from Mr. Price to the Industrial Accident Commission, enclosing to them a copy of the letter of Mr. Boggs. I say that anything he does with the Industrial Accident Commission is not binding on us. It does not tend to prove any issue, and the specifications expressly state that the contractor shall abide by all the safety rules of the Commission.

(Testimony of Thomas Moore Price.)

The Court: I made a statement here. We are now concerned with communications that went from the Industrial Accident Commission—

Mr. Wittschen: To the contractor.

The Court: To the contractor, and, I will say, a representative of the District, so we won't miss anybody.

Mr. Wittschen: Some of them are not.

The Court: When he has acknowledged it it is clear in my mind that he is limited in his authority, and other conditions. Now, I am speaking generally, and I want to clear my own mind up on this, if it is possible to do so. It may not be directly on the subject where we are dealing with the enforcement of the law as they saw it, keeping in mind the plans and specifications here. They were developing that for what purpose? [1349]

Mr. Wittschen: Safety of the workmen, and nobody else.

The Court: I indicated that as a legal matter. I did not see how either side could take advantage of that.

Mr. Marrin: May I make a statement, your Honor?

The Court: It may be I am in error, I don't know.

Mr. Marrin: May I make a statement?

Mr. Wittschen: My answer to your Honor's statement, it was purely for the safety of the workmen; in other words, there were other ways in which

(Testimony of Thomas Moore Price.)

they could have done that. They could have put steel frames under it to support it, but as a practical matter, and without undue cost, they said in the ventilating section, because it was up near the roof, why, they suggested we let them intrude 10 inches. We said all right, we will do that. That was so they would not have to be removed. But if that had not been acceptable and it was a matter of finishing the tunnel, there were other ways in which you could make a tunnel of that size, by going to other methods of operation.

Mr. Marrin: May I make a statement, your Honor? I do not agree, of course, with Mr. Wittschen's position in this matter.

The Court: I do not expect you to, so don't be disappointed.

Mr. Marrin: You asked the witness, for instance, just a moment ago, pardon me for going back to this, but I want to clear the thing up in your mind if I can, as to whether this would have happened if we followed the method pursued by the Industrial Accident Commission.

The Court: I limited that to the thought that the conduct of the Commission in enforcing the law in relation to the safety—I cannot see where either side can take advantage of that in the issues before me. Maybe I do not make myself clear.

Mr. Wittschen: We don't take any advantage of it. It was [1350] the contractor's duty to build it. He was doing the constructing.

(Testimony of Thomas Moore Price.)

The Court: You are offering it, yourself.

Mr. Wittschen: No, I think your Honor has not got my thought. He was the one who was doing the constructing, and the orders of the Commission were paramount as to the method, not as to the result, and we are attempting to say to your Honor that they should have complied with those.

Mr. Marrin: I would like to state, if the Court please, in the first place none of these orders resulted from anything which occurred prior to the time of the cave-in. The contractor was going along with the excavating, and with the retimbering, and resetting, without any objection from the Industrial Accident Commission, or the district, or the district engineer, or anybody. The cave-in occurred which we claim was an unavoidable accident. Thereafter the contractor, in order to attempt to get this tunnel lined, without danger to workmen, without danger of further cave-in, suggested to the district a method of modification. Immediately when the cave-in occurred the Industrial Accident Commission stopped any resetting or retimbering or timbering. It was necessary, therefore, in order to comply with this order, to work out some new design for doing this. The plaintiff promptly attempted to do this and the District wrote a letter to the contractor and refused to permit the modification which was suggested. When the contractor went ahead and attempted to work under this modified plan the District Engineer issued a Cease and

(Testimony of Thomas Moore Price.)

Desist Order, and then, as your Honor will remember, due to the intervention of various orders by the Industrial Accident Commission, finally, after the District insisted the contractor go ahead in strict accordance with the specifications, it was brought to the point where the Commission ordered both the District and the contractor before [1351] it for a hearing. As a result of that, and not until that, did the District consent to any action which would permit the work to proceed. Thereafter—

Mr. Tinning: Mr. Marrin, you agreed to do that.

Mr. Marrin: Now, Mr. Tinning, may I make my statement ?

The Court: I want to give you a full opportunity.

Mr. Marrin: Thereafter the contractor proceeded on the basis of the Commission's order to make this modified section, although the District did not give any formal consent to this until November 8, 1935, and notified the contractor, as we will show by another letter here, that it was proceeding at its own risk until a formal consent was given. Now, all these things, your Honor, caused a great deal of delay in the performance of this work. They caused the work to be shut down. They caused a lot of additional work in connection with the tunnel, and they caused a great delay in the contractor's progress in completing these tunnels, and is our point that when the work is shut down by the order of the State authorities, as a result of

(Testimony of Thomas Moore Price.)

something which the contractor has no control, that this delay—

The Court: You are assuming a fact not in evidence there, that you had no control; you had complete control, did you not?

Mr. Wittschen: Yes.

Mr. Marrin: Well, we had control of the work but an accident happened which is not due to our fault.

The Court: Oh, I see.

Mr. Marrin: It resulted in great delay in the work. It is something which is beyond our control and for which we are entitled to an extension of time, and the District and the District Engineer knew all about these facts when they denied the extension of time, and it is our point that when the work was shut down by [1352] order of the State authorities, as a result of something over which the contractor had no control, it was a delay.

The Court: You are assuming it was something you had no control over.

Mr. Marrin: We had control of the work, but it was an accident that happened, not due to our fault.

The Court: Assuming your position to be correct, was there a delay of the work to any appreciable extent?

Mr. Marrin: Oh, yes, a very serious delay of the work, as has already been testified in this case,

(Testimony of Thomas Moore Price.)

because of the fact that the ground encountered was not of the character which was expected the contractor shut down the further excavation on August 21 in order to attempt to get the concrete up. Then when this accident occurred the work that Mr. Price has just testified to was actually shut down. We were between two fires, the order of the Industrial Accident Commission on one side saying you cannot remove or set back the timbers, and the order of the Commission that you may do so and so, but for the period at least from September 1 until after the order of the Commission on the 24th the contractor did not know what to do.

The Court: All of these difficulties developed when this tunnel was 618 feet on one side, and what is the measurement on the other?

Mr. Tinning: There was about 900 or a thousand feet.

The Court: In any event, all of these difficulties that we have discussed arose out of the portion of the tunnel in which the timber came out?

Mr. Marrin: That is true.

The Court: Very well. You do not need to answer this if you do not wish. Why was not that cemented? [1353]

Mr. Marrin: That is just what we have been trying to prove to your Honor through the testimony of this witness as to the difficulties that we had with the concrete plant which we had contemplated using, and the length of time after that it

(Testimony of Thomas Moore Price.)

took to develop a new concrete plant in order to line this section. Furthermore, if your Honor please, we have shown here through the representation of the geological report that good self-supporting ground might be anticipated, and if we had been in that kind of ground there would have been absolutely no necessity for lining this tunnel at all.

The Court: I see I am getting very little help in solving the matter in my mind. However, the only way that I can see that we can do is allow counsel to have a record and protect your legal rights, even though we are here for so long.

Mr. Wittschen: There are two or three things that are confusing. The first one is when this cave occurred, the ground had been standing for six or seven months. The orders of the Industrial Accident Commission that came in after the cave-in were not formally made at the time of this letter; they were made some 20 days thereafter, if my memory serves me right. It is perfectly true that the District Engineer did not formally say "You go ahead until another 20 or 30 days," and in the meantime they went ahead, they did not stop, they did not wait for a formal order of the District Engineer; as soon as they got the Industrial Accident Commission's order they proceeded to drop the section 10 inches, in connection with correspondence between Mr. Tinning and Mr. Thelen, in which they said we will do that, and we won't charge anything more for it, or make any extra claim; in other

(Testimony of Thomas Moore Price.)

words it was a concession to them to let them drop in this tunnel. Mr. Marrin is claiming that there was a delay of a certain length of time while [1354] the Industrial Accident Commission made its order.

The Court: You answer that by saying the engineer said, "We will let you do this and let you take all risks in the work under your contract." I am afraid I cannot help either side.

Mr. Marrin: May this be allowed in?

The Court: It may go in.

Mr. Wittschen: I suppose we ought to take an exception.

Mr. Marrin: This letter is dated September 14, 1935, and it reads:

PLAINTIFF'S EXHIBIT NO. 71

September 14, 1935.

Industrial Accident Commission,
State Building,
San Francisco, California.
Attention Mr. C. H. Fry, Superintendent of Safety

Gentlemen:

We enclose herewith copy of a letter dated September 5, received from the District Engineer of Joint Highway District No. 13; also a copy of our reply dated September 14.

These copies, together with this letter, are in reply to a letter from your Mr. Fry, dated September 2, 1935, in which it is stated that a

(Testimony of Thomas Moore Price.)

proposed plan for lowering and narrowing the concrete forms, in order not to disturb the present timbering in the tunnel, "or some other plan approved by the consulting engineers, which will give the same result, seems not only desirable but necessary".

This information is given to you in order that the Industrial Accident Commission may be fully informed of the present status of this matter.

For your information, the specifications in paragraph E, section 32, page 60, state that "Timbers found to project within the concrete lines shall be removed and reset before concreting".

Very truly yours,
SIX COMPANIES OF CALIFORNIA,
By T. M. PRICE,
Project Manager.

P:C

[Endorsed]: U. S. Dist Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 71. Filed April 29, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

And the letter enclosed was Defendant's Exhibit SS, which I have [1355] just read.

(The letter was marked "Plaintiff's Exhibit No. 71.")

71.")

(Testimony of Thomas Moore Price.)

Mr. Wittschen: In order to keep the record straight, no copy of that was sent to the District.

Mr. Marrin: I think that is right.

Q. Now, Mr. Price, you then received from the Industrial Accident Commission on September 19, 1935, an order to show cause, which was introduced in evidence as Defendant's Exhibit EEE, which, without reading the whole order, provided that all timber in both the north and south tunnel shall not be removed and reset before concreting, and the concrete forms may be lowered sufficiently to clear encroachments in the tunnel section, or some other plan whereby the timbering will not be disturbed, may be submitted to the Commission for approval.

A. Yes.

Q. After you received that letter from the Commission did you stop work?

A. We had never started on the work involved in this moving or resetting of the timbers; we had resumed concreting the south tunnel in the sandstone section where we were able to do so, and I believe we had made one concrete pour somewhere in the cherts section where there was one place of approximately 20 feet where the timbers had not intruded sufficiently to stop pouring of the concrete in the south tunnel.

Q. Thereafter, as was brought out in the cross examination of Mr. S. D. Bechtel, the Commission issued an order on September 24, 1935, authorizing the placing of the modified section of the arch?

A. Yes.

(Testimony of Thomas Moore Price.)

Q. What did you do after you received that order, Mr. Price?

A. We started lining the tunnels with concrete in conformance with the section which was approved by the District Engineer; by "approved," I mean he approved the lining of it as conforming with the [1356] Commission's order.

Q. I show you Defendant's Exhibit KKK, and ask you if you will explain to the Court what that modification was of the arch which was permitted by the Commission in its order?

A. This is a cross section of the tunnel showing the concrete as designed by the dotted line, the outside dotted line, with a notation on it, "Neat line of type 'A' Section," right there—

The Court: That is the original?

A. The original; the inside section shows the modified line, the outside of the modified section, and this shows the inside of the modified section; that shows dropping the arch 10 inches, and contracting the side walls six inches at some points above the floor line.

Q. No change in the floor?

A. No change in the floor.

Q. You did that to overcome your timber problem?

A. The timber which had intruded down into the concrete section in the cherts formation.

Mr. Marrin: Q. Did that affect the width of the roadway at all? A. No, it did not.

Q. Does this change which you have just pointed

(Testimony of Thomas Moore Price.)

out in this diagram show the total extent of the changes which were made? A. Yes.

Mr. Marrin: Is that clear to your Honor?

The Court: Yes.

Mr. Marrin: Q. After you received the order of the Industrial Accident Commission of September 24, 1935, you proceeded to install the arch, the modified arch?

A. Yes, we constructed timber forms and started pouring the concrete on the modified section.

Mr. Marrin: Now I have here a letter dated October 3, 1935, from Wallace B. Boggs, District Engineer, to the Six Companies of California, which I offer in evidence as Plaintiff's Exhibit next in order. This letter reads as follows [1357]

PLAINTIFF'S EXHIBIT NO. 72

Joint Highway District No. 13 of the
State of California
Oakland, California,
October 3, 1935.

File: Broadway Tunnel Lining.
Six Companies of California,
Field Office,
Post Office Box 120,
Berkeley, California.

Attention of Mr. T. M. Price, Project Manager

Dear Sir:

On October 2, 1935, you poured concrete tunnel lining with forms which do not conform to

(Testimony of Thomas Moore Price.)

the Type "A" section as set forth in the plans.

You are advised that no authorization has been received from the Government Engineer for the placing of the concrete tunnel lining as you placed it on October 2, 1935, and that such lining is subject to rejection in the event such authorization is not received from the Government Engineer.

Yours very truly,

(Signed) WALLACE B. BOGGS,
District Engineer.

WBB/VE

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 72. Filed April 29, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

(The letter was marked "Plaintiff's Exhibit 72.")

Mr. Wittschen: Mr. Marrin, will you stipulate that shortly thereafter or sometime thereafter the Government Engineer gave his approval and they never were required to remove any of that lining, which was the purpose of that letter?

Mr. Marrin: We were not required to remove it, but we never received any formal permission from the District Engineer until November 8, 1935.

Mr. Wittschen: But you went right ahead and put it in?

(Testimony of Thomas Moore Price.)

Mr. Marrin: We went right ahead and put it in in order to get the work done.

Mr. Wittschen: You took none out?

Mr. Marrin: We did not have to take it out, but we took the risk of doing it.

The Court: He recognized he took risk, but he followed it up by saying no.

Mr. Marrin: We did not have to take it out.

Mr. Wittschen: It was simply a matter of waiting for the [1358] Government's approval.

Mr. Marrin: Q. Mr. Price, there was introduced in evidence in connection with the witness S. D. Bechtel's cross examination Exhibit MMM, of which I show you a copy. Are you familiar with that? A. Yes.

Q. You received that letter on or about November 8, 1935? A. Yes.

Q. Is that the first formal permission you received from the District Engineer to place this concrete in this manner? A. Yes.

Mr. Tinning: It was a complete approval of what had been done.

Mr. Marrin: It was the first permission they received from Mr. Boggs.

Mr. Tinning: The first written or formal.

Mr. Marrin: I do not think he ever committed himself otherwise.

Mr. Tinning: Your question says "formal", doesn't it?

(Testimony of Thomas Moore Price.)

Mr. Marrin: The first written approval. Was it the first permission of any kind?

A. Yes, that I had received.

Q. During this time you had been proceeding with the pouring of concrete in the tunnels, had you not? A. Yes.

Q. Will you state on what date you completed the pouring of concrete in the south tunnel, that part of the south tunnel which had been excavated at the time of the cave-in?

A. As a matter of fact, we did not complete the pouring of that section until February 29, 1936. As a matter of practicability we completed it about the 23rd of November, 1935, leaving a portion there in which to conduct operations, an unlined portion.

Q. By that you mean you left a small unlined portion near the face so that you could recommence the excavating operation?

A. Yes. That, however, has been gunnited.

Q. Will you state on what date you completed concreting of the north [1359] tunnel which was excavated at the time of the cave-in of August 28, 1935?

A. Approximately on January 15, 1936.

Q. When was the excavation resumed in the south tunnel?

A. The excavation was resumed in the south tunnel at station 124+57 on February 2, 1936.

Q. When was excavation resumed in the north tunnel? A. December 22, 1935.

(Testimony of Thomas Moore Price.)

Q. How long was the excavation carried on by Six Companies thereafter in the tunnels?

A. I wish to make a correction in the previous statement in the south tunnel, if I may.

Q. Yes, surely.

A. The date that I gave you was the core excavation. In the south tunnel we proceeded to excavate the tunnel by constructing side wall drifts without doing any core excavation until we contacted and intercepted the drifts which had been driven from the east end. That work was done prior to any core excavation in the south tunnel.

Q. When did you commence that work?

A. That work was commenced on November 26, 1935, approximately.

Q. From then on until late in February, which you gave us before, you were excavating drifts in the south tunnel?

A. Yes, we did not do any work in the south tunnel but excavate side wall drifts through to where we contacted the east portal drifts.

Q. And you contacted those two east portal drifts in February of 1936? A. Yes.

Q. And thereafter did you excavate the south tunnel by the wall plate system?

A. We went back there again to where we had started to drift and excavated the core and followed up with the concrete lining; after we reached the wall plate drift from the east end then we proceeded to drive the tunnel by the wall plate drift method.

(Testimony of Thomas Moore Price.)

Q. When you resumed excavation in the north tunnel what system was followed there?

A. The wall plate drift system. [1360]

Q. Then did you continue the excavation continuously thereafter in the two tunnels—for how long did you continue continously?

A. The excavation was continued in the south tunnel without interruption and in the north tunnel without interruption until February 22, 1936.

Q. Why did you stop at that time?

A. We experienced a cave-in in the north tunnel.

Q. And after the cave-in was cleared was work thereafter resumed in those tunnels? A. Yes.

Q. Will you state the date on which your work was resumed in the south tunnel?

A. Work was resumed in the south tunnel on March 26, 1936.

Q. In which tunnel did the cave-in occur?

A. In the north tunnel.

Q. Would you state when work was resumed in the north tunnel after the cave-in of February 22nd?

A. Approximately on the 5th to 9th of May, I have it here. I presume the first excavation was made on the 9th of May.

Q. 1936? A. Yes.

Q. Was the excavation carried on then continuously in both tunnels? A. Yes.

Q. What was the character of the ground in the tunnel which was encountered after the resumption of excavation following the first cave-in and up till June 13, 1936?

(Testimony of Thomas Moore Price.)

A. It continued heavy and non-uniform somewhat similar to the ground which we had previously passed through.

Q. Was any of it self-supporting? A. No.

Q. Mr. Price, during the time that you were employed by Six Companies of California, who set the lines and grades of the tunnels in which you worked in constructing the tunnel?

A. The Six Companies of California engineers.

[1361]

Q. Who set the lines and grades on the outside work?

A. The Highway District No. 13 engineers.

Q. Do you know what lines and grades, if any, the District set in the tunnel during that period?

A. No, I am unable to say. I saw their men working back behind us at various times, but they never did any work which helped us in any way. The tunnels were driven and the bore was made by work done by our own engineers. I am unable to state what they did.

The Court: Were they in your way?

A. No, they were not in our way. They were behind us.

The Court: We will take an adjournment now until Tuesday morning at ten o'clock.

(An adjournment was here taken until Tuesday, May 3, 1938, at ten o'clock a. m.) [1362]

(Testimony of Thomas Moore Price.)
Tuesday, May 3, 1938;
10 O'Clock A. M.

THOMAS MOORE PRICE

Direct Examination (continued)

Mr. Marrin: If your Honor please, in connection with Mr. Larson's testimony, there appears a statement, on pages 313 and 314 of the transcript, in which he testified, in answer to certain questions of Mr. Tinning, that at the time he examined the tunnels on August 28, 1935, the east portal drifts were driven all the way through. That was an error; and the other side is willing to stipulate the transcript may be corrected.

Mr. Tinning: Yes.

Mr. Marrin: To show they were not driven through at that time.

Mr. Tinning: But, in making this stipulation, it may be understood that there were several hundred feet of portal drifts excavated on the east portal, but none of them had penetrated through to the west portal excavation at that time.

Mr. Marrin: Yes.

Mr. Tinning: The question was with respect to the inspection of the Orindan formation in those tunnels; but, in so far as Mr. Larson's answer applies to the portion that he saw, why, it will be understood it will stand,—his answers.

(Testimony of Thomas Moore Price.)

Mr. Tinning: It was a mutual mistake as to how far that work had progressed.

Mr. Marrin: Yes.

Q. Mr. Price, I show you a tabulation entitled "Work Completed by Six Companies of California." Was that prepared under your direction?

A. Yes, sir.

Q. From the records of Six Companies of California? A. Yes, sir.

Q. To the best of your knowledge, it is correct?

A. It is. [1363]

Q. Will you state what that shows?

A. That shows the work completed by Six Companies of California, on a footage basis; it shows the excavation in the tunnel,—the portions where the excavation was completely performed, where only the ring excavation was performed, the wall plate drifts, the east end drifts, the rings on the east end, and the excavation on the east end.

Q. That was the amount completed up to June 13, 1936? A. Yes.

Mr. Tinning: May I ask a question, here, Mr. Marrin, in the interest of time?

Mr. Marrin: Surely.

Cross Examination

Mr. Tinning: Apparently, from the tabulation, the north tunnel shows 2,875 feet. You have added drifts and ring excavation and completed excava-

(Testimony of Thomas Moore Price.)

tion, so that you have practically put the tunnel through.

The Witness: That is the complete work.

Mr. Tinning: I don't think you understood me, Mr. Price. The figures at the bottom of the totals here show 2,875 feet. You have added the rings, the wall plate drifts—I think that should be made clear.

The Witnes: Yes. In other words, we had done some work in every portion of the tunnel; that is the station starting at the beginning of the tunnel and the station at the end.

Mr. Tinning: Q. I understand; but you have a total, under "Excavation," which might be understood that you excavated 2,875 feet.

A. Well, that would not be correct. The excavation for the tunnel is that portion in the first line, from station 111+43.45 to 129+86, a total of 1,843.45 feet on the west end; and the full excavation on the east was from 139+48 to the end, a total of 70.16 feet.

Q. Yes. So, it really might be misleading, unless it was explained that you have added all the lineal feet of drift, you might have [1364] built on both sides, and, as a matter of fact, you have about 1,900 feet of excavation completed, and the rest was drifts partially excavated?

A. Yes. On the second page, the same procedure is carried all the way through on each item of work,—the ventilating concrete—here, we have, on

(Testimony of Thomas Moore Price.)

the second page, that no concrete placed at all for a distance of 1,000 feet—

Q. The point is: These totals are not totals of the same thing; they are the result of a numerical addition of the various footages of drifts and so on? A. Yes.

Q. That was shown on the diagram?

Direct Examination (resumed)

Mr. Marrin: These totals are the total length of the tunnels? A. Yes, they are.

Q. The detail shown above shows the amount of excavation which was carried on in that part of the tunnel which was excavated? A. Yes.

Q. Does that also show the amount of the concrete placed, Mr. Price?

A. Yes; it shows the timbering, also; the excavation above the timbering; then the concrete rings; then the grouting and the ventilation concrete, in each tunnel.

Mr. Marrin: I offer that in evidence.

Mr. Tinning: Subject to checking against the figures,—I assume they will be correct; and also subject to Mr. Price's explanation that the totals do denote different classes of work in each case?

Mr. Marrin: Surely.

The Court: This is off the record.

(Discussion, off record.)

The Court: We will proceed.

(The document was marked "Plaintiff's Exhibit No. 73.")

(Testimony of Thomas Moore Price.)

PLAINTIFF'S EXHIBIT NO. 73

Work Completed by Six Companies of California

Excavation			
North Tunnel			
Excavation completed	111+42.55	129+86	1,843.45
Ring excavation	129+86	130+44	58.
Wall plate drifts, both sides	130+44	131+37	93.
Wall plate drift, right side only	131+37	132+36	99.
East wall plate drifts, both sides	132+36	139+35.3	699.30
Ring excavated	139+35.3	139+48	12.70
Excavation completed	139+48	140+18.16	70.16
Total			2,875.61
South Tunnel			
Excavation completed	111+53.25	135+79	2,425.75
Ring excavated	135+79	136+18	39.
East wall plate drifts, both sides	136+18	140+08	390.
Ring excavated	140+08	140+25	17.
Excavation completed	140+25	140+97.68	72.68
Total			2,944.43
Timbering			
North Tunnel			
Open cut, no timbering	111+42.55	111+58	15.45
Full timbering	111+58	129+80	1,822.
Ring timber placed	129+80	130+43	63.
Wall plate only	130+43	130+70	27.
Wall plate drifts, both sides	130+70	131+37	67.
Wall plate drift, right only	131+37	132+36	99.
Wall plate drifts, both sides	132+36	139+35.3	699.30
Full timbering	139+35.3	139+78	42.70
Open cut, no timbering	139+78	140+18.16	40.16
Total			2,875.61

(Testimony of Thomas Moore Price.)

South Tunnel			
Open cut, no timbering	111+53.25	111+68	14.75
Full timbering	111+68	135+64.5	2,396.50
Ring timber placed	135+64.5	136+16.50	52.
Wall plate only	136+16.5	136+76	59.50
Wall plate drifts, both sides	136+76	140+08	332.
Full timbering	140+08	140+51	43.
Open cut, no timber	140+51	140+97.68	46.68
Total			2,944.43
Concrete Lining			
North Tunnel			
Complete lining	111+42.55	128+49.60	1,707.05
Footings, both sides	128+49.60	129+15.00	65.40
Footing, left side only	129+15	129+16	1.00
No concrete placed	129+16	139+39	1,023.00
Complete lining	139+39	140+18.16	79.16
Total			2,875.61
South Tunnel			
Complete lining	111+53.25	134+28	2,274.75
Footings, both sides	134+28	135+03	75.
Footing, right side only	135+03	135+08	5.
No concrete placed	135+08	140+10	502.
Complete lining	140+10	140+97.68	87.68
Total			2,944.43
Grouting			
North Tunnel			
Grouted	111+42.55	122+50	1,107.45
Not grouted:			
Schedule "A"			1,089.16
Schedule "B"			679.00
Total			2,875.61

(Testimony of Thomas Moore Price.)

South Tunnel			
Grouted	111+53.25	122+00	1,046.75
Not grouted:			
Schedule "A"			581.68
Schedule "B"			1,316.00
Total			2,944.43
Ventilation Slabs			
North Tunnel			
Lower Deck and Side Walls			
April, 1936	111+42.55	112+49	106.45 L. Ft.
May	112+49	117+38	489.00
June	117+38	120+27	289.00
Not concreted	120+27	140+18.16	1,991.16
Total			2,875.61
Upper Deck			
April, 1936	111+42.55	112+73	130.45 L. Ft.
May	112+73	117+31.5	458.50
June	117+31.5	120+16	284.50
Not concreted	120+16	140+18.16	2,002.16
Total			2,875.61
South Tunnel			
Lower Deck and Side Walls			
April, 1936	111+53.25	111+83.2	29.95 L. Ft.
May	111+83.2	117+34.7	551.50
June	117+34.7	120+38	303.30
Not concreted	120+38	140+97.68	2,059.68
Total			2,944.43

(Testimony of Thomas Moore Price.)

Upper Deck			
April, 1936	111+53.25	111+88.2	34.95 L. Ft.
May	111+88.2	117+31.8	543.60
June	117+31.8	120+35	303.20
Not concreted	120+35	140+97.68	2,062.68
Total			2,944.43

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plaintiff's Ex. No. 73. Filed May 3, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

Mr. Marrin: I have here a poster which shows the modified sections of the tunnels about which we were talking on Friday, and shows the sections of the tunnels in which the modified section was [1365] installed and the section in which the regular concrete lining was installed; and also shows the places where the concrete lining was placed with wood forms and the place where it was placed with steel forms; and I want to examine the witness with respect to that, and I would like to offer that in evidence as plaintiff's exhibit next in number.

Mr. Tinning: Subject to check as to accuracy of distances.

Mr. Marrin: Surely.

(The document was marked "Plaintiff's Exhibit 74.")

Mr. Marrin: Q. Mr. Price, will you explain what that exhibit shows?

(Testimony of Thomas Moore Price.)

The Court: Exhibit what, for the purpose of the record?

Mr. Marrin: Exhibit No. 74.

The Court: Briefly outline what that diagram indicates.

The Witness: A. The two drawings at the bottom of the poster indicate on the left the typical cross-section of the concrete as designed; on the right, it indicates the typical cross-section as modified.

Mr. Marrin: Q. That was modified after the order of the Industrial Accident Commission on September 24, 1935?

A. Yes. The plan, at the top of the poster, shows the two tunnels and the pink portion,—the part that is colored pink, or red,—indicates the portion where the standard section was used,—the section on the—

Q. By "standard section," you mean the section as stated in the original plans and specifications?

A. Yes; and the blue portion indicates the place in the tunnel, or places, where the modified section was used,—the modified concrete section. In each of these two colorings, the hatched portion indicates the places where timber forms were used, where we were unable to use steel forms, and built timber forms in place. The white portion, or where no [1366] color exists, indicates the point where no concrete lining was placed in the tunnel.

Q. By Six Companies of California?

(Testimony of Thomas Moore Price.)

A. By Six Companies of California.

The Court: Q. The white portion?

A. The white portion at the right-hand side of the poster.

Q. Did it need any support at all?

A. We did not do that work, your Honor.

Mr. Wittschen: That was left; but that was done by others.

Mr. Marrin: Q. In other words, the end of the colored section indicates the points to which the Six Companies had completed the main concrete lining at the time they stopped work on June 13, 1936?

A. Yes, sir.

Q. And the white portion here was finished by another contractor? A. That is correct.

Q. To the best of your knowledge, is that poster correct, Mr. Price?

A. Yes, to the best of my knowledge, it is.

Q. Mr. Price, will you describe, or tell us of what the concrete plant consisted which was required for placing concrete in the lining of these tunnels?

A. I will describe the plant according to the flow of the concrete and the materials that went with it. We required a place on the railroad for unloading the sand, gravel and cement to make the concrete. This particular place was a portion of the highway down near what was called the Landvale Cutoff. We hauled the material approximately a mile and a half to a mixing plant, where

(Testimony of Thomas Mo[illegible] Price.)

the separate ingredients for the concrete,—consisting of sand, gravel, cement and water,—were weighed out, and then mixed in a mixer. The next portion of the plant was a requirement to haul the mixed concrete from this mixing plant which was located near the west portal into the tunnel. The next portion of the plant [1367] was a machine required to force that concrete through pipes into the forms,—the forms which held the plastic concrete until it could set up and become firm; that was the last section of the plant.

Q. During the time you were employed by Six Companies, Mr. Price, how many hours per day was the work carried on?

A. It was carried on 24 hours a day for 6 2-3 days a week, throughout the year, with the exception of one or two days,—holidays; and I think it was July 4th.

Q. With full crews?

A. Yes, as near full crews as we could obtain. [1368]

Q. Why was the one-third day a week not worked?

A. Because of the 40-hour limitation placed upon men, we used four shifts to work a week's period, the shifts being only 21 shifts in a week, three shifts per day, would be 21 shifts per week; we were only able to work in that manner, divided among four crews, which made five shifts for each man at 8 hours per day, a 40-hour week.

(Testimony of Thomas Moore Price.)

Q. In other words, the reason you did not work seven days a week was because you could not divide the shifts into the total number of hours?

A. Yes, we took one shift off on Sunday.

Q. Mr. Price, will you state what timber was left in place before the concrete lining was laid by the Six Companies of California?

A. All of the timber was left in place that did not intrude into the neat concrete section, as far as I know or recall.

Q. None of the timber outside of the neat lines of the concrete was taken out before the lining was placed?

A. I don't recall any.

Q. During the time you were employed by Six Companies of California did the company do anything which delayed the work?

A. Not to my knowledge.

Q. The work was shut down two or three days in September, 1935, was it not? A. Yes.

Mr. Marrin: That is all. You may cross examine.

Cross Examination

Mr. Tinning: Q. Mr. Price, you have just been discussing the concrete plant and the loading plant; the loading plant, showing this perspective map, Defendant's Exhibit P, that you described on the Landvale connection was at about where I am pointing

(Testimony of Thomas Moore Price.)

near Lake Chabot and Pacific Gas & Electric Substation, was it not?

A. I would term it the unloading plant rather than a loading plant, yes. [1369]

Q. You had a sidetrack from the Sacramento Northern on which cars came in and then you loaded into that plant, or unloaded into the plant, and loaded into the cars? A. Yes.

Q. And your concrete plant was on the north side of the road, just west of the portal buildings, that is, the mixing plant, was it not? A. Yes.

Q. And your railroad system, the same railroad system that you used for transporting muck out of the tunnel was used for hauling the concrete into the tunnel, was it not?

A. With the exception of that portion or a portion of the railroad outside of the tunnel.

Q. You had a switch running over, but it was a matter of 200 or 300 feet from the portal, was it not? A. Yes.

Q. You said the other day when you came there in September you threw that railroad over to the other side of the canon. Now, looking at this perspective map, is it not a fact that what you did was put a rock bunker, a muck bunker, approximately opposite the concrete plant on the south side of the road, perhaps a little further west than the concrete mixing bunker, but in the same general locality?

A. Yes.

(Testimony of Thomas Moore Price.)

Q. And that you eliminated the railroad from that point of the west portal where your track entered near the muck bunker, down to the part where it had formerly run, it was pulled out of there, and you later used that track as you went into the tunnel? A. Yes.

Q. Mr. Price, when you testified here last week you stated you had been with the Kaiser Company approximately 18 or 20 years. I think you said you started to work for Mr. Kaiser in Seattle in 1919; is that correct? A. Yes.

Q. How long has the Kaiser headquarters been in Oakland, California? A. Since about 1921.

Q. Since that time has your home been in Oakland? A. No, not wholly. [1370]

Q. I do not mean when you were off on jobs in your construction work, but where was your residence since 1921?

A. I resided in several places.

The Court: He wants to know where your home was. A. I had several, I had no one home.

Mr. Tinning: Q. Did you vote in those places where you were?

The Court: You resided at various places?

A. Yes.

Q. Are you a man of family? A. Yes.

Q. Where did your children go to school?

A. Where I was.

Mr. Tinning: Q. How long have you resided in Oakland?

(Testimony of Thomas Moore Price.)

A. I resided in Oakland from about 1924 to approximately 1931, and I resided in Boulder City from approximately 1931 to 1934, and I have since resided in Oakland.

Q. So that you had lived in Oakland about seven years before you went to Boulder dam, and then when you came back to go on this Broadway Tunnel job in 1934 you returned to Oakland to live?

A. Yes.

Q. As I understood your testimony you said that while you were employed by Mr. Kaiser up to 1931 that you had been the superintendent on paving, earth dams and industrial plant construction, largely?

A. I have been superintendent for the company, but I have not been particularly in charge of earth dams; I have been largely on paving, aggregate production and on dams where the aggregate production was connected with the dams.

Q. When you went to Boulder Dam to take charge of the building and operating of the aggregate plant you took along with you a long experience in the handling of that type of work, handling aggregates, designing plants and operations?

A. Yes, approximately ten years. [1371]

Q. As I understood, one part of your work at Boulder Dam was arranging a method of transportation of tunnel muck for Six Companies.

A. Yes.

(Testimony of Thomas Moore Price.)

Q. By the way, Six Companies, Inc., that you worked for at Boulder Dam, that is not the same corporation that was building this tunnel?

A. It was a different corporation.

Q. A different corporation? A. Yes.

Q. Were all of the constituent companies the same in the Six Companies of California, the plaintiff in this case, as the constituent Companies of the Six Companies Inc. which built the Boulder Dam?

A. I do not believe they were actually exactly the same, but I believe practically the same.

Q. What did you mean when you said that when you came to work on September 20, 1934 you took charge of the business end of the project, of the tunnel?

A. Well, I mean just that, the management of the job, the negotiations with the subcontractors, negotiations with the District Engineer, approval of purchases, seeing that the proper records were kept, checking the work that was being done in the tunnel, and seeing that the proper supplies were obtained, and work of that nature; largely executive work, if I may say that.

Q. What is that?

A. Largely executive work.

Q. Executive work? A. Yes.

Q. You had trained technical tunnel men under you in your employ, did you not? A. Yes.

(Testimony of Thomas Moore Price.)

Q. Had you ever been the superintendent or project manager on any job before which had to do with the construction of a tunnel? A. No.

Q. This was your first job?

A. This was my first job.

Q. When you took this work, managing the driving of this tunnel, Mr. Price did you make any investigation of tunnels that had been built in this Bay Area?

A. Well, I do not quite understand your [1372] question. Do you mean prior to my taking the work?

Q. Well, yes, when you started in, either on September 20 or immediately following September 20, when you went on with the work, did you make any investigation or any study as an engineer of the problems that had been met in the various tunnels that had been constructed around San Francisco Bay?

A. Yes, I gathered all the information that I could in my contact with our people.

Q. Did you find any of those tunnels built in self-supporting ground?

A. I don't recall that I did.

Q. Did you find any of those tunnels built where you were able to drive with a full-face operation?

A. Well, the time we investigated as to those, do you mean?

Q. Well, at any time.

(Testimony of Thomas Moore Price.)

A. At any time up to that time, I do not recall that I did, with the exception of a small tunnel that had been driven by a full-face method, as a matter of fact the drift on the east end of the Broadway tunnel was driven by a full-face method.

Q. I am talking of comparable tunnels, there are highway tunnels, or railway tunnels, or some of comparable size, did you find any of those?

A. No, I did not find any of comparable size.

Q. Did you find any tunnels that had been driven here without the use of timber for support?

A. With the exception of one or two, one particularly, I remember, on the Southern Pacific near Oleum; I believe that is the only one, that is not supported with timber.

Q. That is the only one, and that is through sandstone with every little overbreak, is it not?

A. Yes.

Q. It is the tunnel adjacent to the Union Oil Company's plant on the south shore of San Pablo Bay, is it not?

A. Yes. I have passed through it several times and noticed it had no support.

Q. Did you have that in mind when you were conducting the operations [1373] on the Broadway Tunnel? A. I don't recall particularly.

Q. Your inspection was made as you went through on the train? A. Yes.

Q. Last Friday Mr. Marrin read to you some letters, Defendant's Exhibits BB and CC, which

(Testimony of Thomas Moore Price.)

had already been introduced, regarding the extension of time on outside work. He did not read to you another letter which was put in evidence, Defendant's Exhibit FF, a letter of January 23, 1935, in which Mr. Boggs replied to your letter of January 18th, when you discussed the possibility of requiring an extension, in which Mr. Boggs told you that this was outside work upon which time of completion did not seem to have any bearing on the completion of the contract, and it did not appear that the suspension of work which he had ordered in any way could constitute a basis for the granting of an extension of time. You remember that letter, do you not?

A. Yes, I have some recollection of it.

Q. And then on the next day, you wrote a letter to Mr. Boggs, January 24, 1935, which is already in evidence as Defendant's Exhibit GG, in which you stated that you did not mean your previous letter to be an application for extension of time, but wished merely to call his attention to the paragraph of the specifications governing this.

> "We merely wish to put ourselves on record in the matter with the thought that actual decision as to the extension might be made at the time application is made if decided necessary, and provided by the specifications."

The matter dropped at that time, did it not? There was nothing further about that?

(Testimony of Thomas Moore Price.)

A. Yes.

Q. And it was true that the time required for this work was comparatively short and did not control, it was outside work, and it was concrete structures from the west portal down to the west end of the approach, and on the Landvale connection that he was referring to, was it not?

A. Yes, but I didn't know what might happen in the future. [1374]

Q. It was work which required a comparatively short time to complete?

A. No, I would not entirely agree with that.

The Court: Q. In other words, it was not the tunnel proper, in any event?

A. No, it was not the tunnel proper. It took considerable time, though, to complete it.

Mr. Tinning: We will come to that, Mr. Price. As a matter of fact, it was not completed when you left, or when the Six Companies quit on the 13th of June, 1936, was it? A. No.

Q. Although the schedule of Six Companies, filed on August 9, 1934, said that all of the foundations and all of that work would be completed by December 1, 1934. Do you remember that schedule?

A. I believe it did. I think it is a matter of record.

Q. Defendant's Exhibit N. And that schedule showed, did it not, that you intended, the Six Companies intended at the time the schedule was filed to so conduct the work that all of the footings, all

(Testimony of Thomas Moore Price.)

of the structural work on all of the structures on the 2½ miles of highway up to the west portal building would be completed by December 1, 1934—that is what that schedule showed—that was the schedule filed with the District, was it not?

A. I would prefer to examine the schedule again.

Q. It is Defendant's Exhibit N.

Mr. Tinning: Your Honor has seen this at various times before. I might say it is the construction schedule filed with the District or sent to the District on August 9, 1934, Defendant's Exhibit N.

Q. Isn't it true that all of the structural work, the Golden Gate Avenue crossing foundation would be completed by November 1?

A. No, the Golden Gate Avenue crossing foundation was to be completed September 25.

Q. September 25?

A. Yes. You are looking at the Tunnel Boulevard.

Mr. Wittschen: 1934.

Mr. Tinning: September 25, 1934?

A. Yes. [1375]

Q. Landvale foundation by October 10, 1934?

A. Yes.

Q. So that all of the foundation work which was the subject of the correspondence in which Mr. Boggs asked you to cease operations, when you sent this schedule in to the district was planned to be done by the middle of October, or 20th of October,

(Testimony of Thomas Moore Price.)

was it not, the Landvale foundation September 25, Golden Gate Avenue crossing foundation October 10?

A. Yes, apparently it was. This is a proposed schedule at that time, not an actual schedule.

Q. It is a schedule of what you proposed to do?

A. Yes.

Mr. Wittschen: You did not give the year.

Mr. Tinning: 1934, this schedule, the first that we have been discussing, you and I both understood, for the sake of the record, it all referred to 1934?

A. Yes. For the record also I think it should be clear that is for grading only, and that the structural concrete had to be performed after that time.

Q. And the structural concrete showed that that was proposed to be completed, looking down on the structure miscellaneous work, small areas in the structure were to be completed by November 15, miscellaneous east portal wall and culvert by November 10—that work was all supposed to be completed by then, Temescal culvert, west portal retaining wall.

A. By this construction schedule it was—it was proposed it would be completed at that time.

Q. As a matter of fact that schedule, in fairness to you, Mr. Price, was prepared before you came on the job, was it not? A. Yes.

Q. By your predecessor? A. Yes.

(Testimony of Thomas Moore Price.)

Q. The schedule that was submitted with your letter of February 12, 1935 was one which was prepared while you were project manager, was it not?

A. It was prepared with the best information I had at that time as to—

Q. What you proposed to do?

A. When the work would be completed. [1376]

Q. And you show the work for the Golden Gate Avenue crossing foundation to be completed by June 30, 1935, do you not? A. Yes.

Q. And the other work, structural and paving was all to be completed by that date, was it not?

A. Yes.

Q. That was not done?

A. The structural and paving, no

Q. I am not talking about paving. I am talking about the structural work, the pouring of concrete, the walls and those structural areas; I have not discussed paving at all.

A. I misunderstood you. I thought you said structures and paving.

Q. Under the heading "Structures and paving," but I am referring to the item "Culverts, retaining walls, Temescal culvert," all of those were to be done by June 30, 1935, were they not?

A. Yes.

Q. They were not finished, were they?

A. No.

Q. Was the district in any way responsible for the fact that that schedule was not maintained?

(Testimony of Thomas Moore Price.)

Mr. Smith: I object to that question on the ground it is argumentative.

Mr. Wittschen: It is a proper question. He said he was without fault. We are now asking if the district was in any way responsible for that, where they said they would be finished in 1935.

Mr. Smith: That is purely a legal question, and calls for a judgment of the Court and not the witness. He can testify to the facts only.

The Court: Read the question. (Question read.) You may answer. A. I believe that it was.

Mr. Tinning: Q. In what respect?

A. In order to pour the concrete structure it was necessary to start somewhere and the place that I wanted to start in January, where Mr. Boggs stopped me, was the first concrete to be placed in the structure, namely, the footings; and that was the only place where the weather might have any effect on the work. [1377] It was my contention at that time that if he would let me pour those footings between storms that I could pursue the rest of the concrete work that spring, whether it rained or whether it did not rain, and get that concrete structure completed so that the grading could be resumed when dry weather came. Now, if we could never start the footings we could never pour the concrete structure. It turned out that that happened to be a wet spring, and we were not able to get back to these footings until along in May.

(Testimony of Thomas Moore Price.)

Q. There had been six months since the contract had been let, there had been two schedules filed with the district, one before you were project manager and one in February, that you had all of the fall of 1934 and none of the concrete was poured in those footings at that time, was it?

A. None of the concrete had been poured in the footings.

Q. In other words, this was all basic work, and it was in January, when you had open excavations, which were full of rain water, and there was wet ground around and you could not get a good foundation to put these foundations in that Mr. Boggs said you were not going ahead with the work because you were delayed in getting started, isn't that true, that if you had started before the rains set in you would have had no trouble?

A. I am sorry, the question is so involved I could not answer it.

Mr. Tinning: I am sorry. I will divide the question.

Q. Why didn't you do the work between June and December, 1934?

A. We were doing other work which seemed to be equally important, and we thought we could continue the work.

Q. Isn't it a fact that all of this work was subcontracted? A. Yes.

Q. And there was no reason why these subcontractors, with proper forces of men, proceeding at

(Testimony of Thomas Moore Price.)

the proper speed in the summer and fall of 1934, could not get that concrete in in that summer and fall, was there? You just did not do it?

A. I would like to correct [1378] my former answer. I say it was all subcontracted. I believe it was at that time. I think later on we took over some of the work.

Q. But in 1934 you had subcontractors selected by Six Companies employed to do this work, did you not? A. Yes, at that time we did.

Q. And you gave the District a schedule showing that the work would be done at that time?

A. Yes.

Q. Why didn't you do it?

A. Apparently they were not able to get that much work done in that period.

Q. Is that your conclusion, or do you know?

A. It is my conclusion. I saw the work almost constantly and pressed them every day for the work; they seemed to be going as fast as they could reasonably. The work that we were pressing was particularly the work at the portals of the tunnel, and the retaining walls where wet weather conditions would be very disadvantageous, and I believed personally that the bridge work could be done during the winter season.

Q. But the District Engineer did not agree with you on that? A. He would not let me start.

(Testimony of Thomas Moore Price.)

Q. And you wanted to start at the end of December or the 1st of January, and six months had elapsed at that time?

A. We were continuing at the time.

Q. It is true, is it not, that six months had elapsed when you wanted to start putting in the foundations of these buildings?

A. No, I cannot agree with you, because we had already started with it, we had never stopped.

Q. Did you have any concrete in? A. Yes.

Q. Where?

A. We had concrete in the west portal retaining wall.

Q. We are talking now about these structures. What did you have in from the west portal walls at the approach to the cut at Broadway, about two and a half miles of highway?

A. We had, I believe, all of the culverts in; we had to put the culverts in before any concrete [1379] work could be performed. We had gotten, I think, most of the walls in. We had performed some of the work on the east end where there was a large culvert which had to be done because of stream diversion there, and we were just preparing, we were continuing the work at the time; we were not starting the work. The work had been continued all that time and was being continued in January.

Q. The letter DD of Mr. Boggs told you not to start footing excavation, did it not? A. Yes.

(Testimony of Thomas Moore Price.)

Q. So that there were excavations which you were proposing to start in in the middle of the rainy season, at the time you wrote that letter?

A. No, I won't agree with you about starting; we were continuing.

Q. Mr. Price, we are not trying to fence with each other. We can go on faster; you understand I am talking about particular structures that are referred to in this letter. A. Yes.

Q. Do you remember the letter?

A. Yes. Might I explain what I mean, and maybe that would clear it up. We had excavated the structures and the footing for the Golden Gate Bridge, as I would call it, two or three times, and had a shower on it, and that work had been done in December, and each time that it rained the engineer required us to go back and clean up the work, and possibly excavate a little more footing so as to get a good cut for the footing.

Q. Was that unreasonable?

A. No, I don't think so.

Q. In other words, it was the only way that the work could be done properly, was it not?

A. Yes.

Q. And when it became wet from rainfall you had to clean it before you put the concrete in in order to get a proper foundation?

A. Yes. I had not quite finished with my other statement. It was my plan to get that first concrete poured between storms, if we could only get

(Testimony of Thomas Moore Price.)

a foot of it poured, and then proceed with the work.

Q. Have you finished? A. Yes. [1380]

Q. Why didn't you do that work between June and December, as the schedule showed you planned it?

A. The subcontractors could not get around to it.

Q. You selected the subcontractors, the Six Companies did?

A. The Six Companies of California did.

Q. Why didn't you do it in the succeeding year between May and December?

Mr. Smith: You mean 1935?

Mr. Tinning: 1935, that is the succeeding year.

A. We did do it.

Q. Did you finish it?

A. We finished the portion that we are talking about, the footings; I believe we practically finished the Golden Gate Bridge and most of the Landvale viaduct.

Q. Do you say most of the Landvale was done when you left in 1936 in June?

A. Yes. I think the greater portion of it was completed. That would be a matter of record. I have not got the exact percentage.

Q. As a mater of fact, there was a good deal of it; you had the main structure in but all the upper works had to be finished by the other contractor after you left?

A. If you are referring to the walls, the railing

(Testimony of Thomas Moore Price.)

on each side of the bridge, I think that had to be done.

Q. Quite a good deal of work remained to be done?

A. A question of percentage, I don't know the exact percentage.

Q. On the east portal you had to have that culvert in there so that the highway could pass over. That was the reason for that, was it not?

A. And also to take care of the drainage from that creek, from the portal, which was down in the bottom of the canon.

Q. That was done in the fall of 1934, was it not?

A. Yes.

Q. Isn't it a fact that this plan for carrying on the work that was given the District on August 9, 1934, called for the progress of all of these structures consecutively, concurrently—the contractor [1381] was not going to work on one structure and then then when he finished that go to another—the exact lines shown on that diagram showed proposed progress of those various outside structures were to run along consecutively, I mean concurrently, so that two or three jobs were going on at the same time. That was the way it was proposed, was it not? Would you like to look at the diagram? This is the August 9th plan which shows that this work was to be carried on concurrently.

A. This is the proposed construction schedule

(Testimony of Thomas Moore Price.)

again, and it shows exactly what work was proposed to be done at a certain time.

Q. The Sacramento Northern Railway work was to be done between July 5 and September 15?

A. September 10.

Q. September 10? A. Yes.

Q. The Landvale connection culverts were to be done at the same time?

A. To be done August 31.

Q. They were to be done concurrently, then?

A. Those two were to be performed concurrently.

Q. The west portal wall and the Temesal culvert were both being done, were planned to be done at the same time? A. Those two.

Q. The Golden Gate overhead miscellaneous west end structures were all planned to be done at the same time?

A. They were not planned to be done, they were running concurrently.

Q. The east portal walls and culverts were supposed to be running during the same period—that took a longer period than this other work on the west end tc be done?

A. Not all of the other work; only the Landvale, the Golden Gate.

Q. What about the Temescal culvert?

A. Yes, it took a portion of that time.

Q. Did the same subcontractor have the work at the east end that was doing the work on the west portal? A. Yes. [1382]

(Testimony of Thomas Moore Price.)

Q. Or the west approach? A. Yes.

Q. Was any of the work done concurrently?

A. I am sorry, I did not follow you.

Q. Was any work done by the subcontractors—the subcontractor was a man named Ball, was it not? A. Yes.

Q. And Mr. Ball subcontracted to a man named Bohnett? A. Yes. [1383]

Q. Did Bohnet build the culvert on the east side?

A. I believe he did; that work was done before I arrived.

Q. That was completed before you got there; so that did not delay the work, did it?

A. No; I don't think it did.

Q. That followed on schedule?

A. I am not positive exactly, on the date it was started and was completed.

Q. But it wasn't anything to trouble you, and would delay you by reason of it? A. No.

Q. So that, while our problems from now on will be a discussion of the west portal, it is a fact, on the west approach, where Mr. Bohnet was a subcontractor under Mr. Ball, who was a subcontractor under Six Companies, the work was not done in accordance with the schedule? Isn't it true that, by supplying adequate equipment and a proper number of men, there was no reason whatsoever that that work could not be done?

A. I would not agree with the last part of your

(Testimony of Thomas Moore Price.)

statement. I would say it would be very uneconomical to put a crew on every structure.

Q. It would be a question of economics, then, not progress?

A. I presume the Contractor had that in mind in doing his work.

Q. Mr. Bohnet had a subcontractor working for him, didn't he, named Harry Talbot, who hauled the material?

A. Yes. I wouldn't call him a "subcontractor," unless you would call anyone that you purchase anything from "a subcontractor."

Q. Do you call hauling something you purchase——

The Court: A supply man?

The Witness: A. Yes, a supply man.

Mr. Tinning: Q. Then, it is true, isn't it, that Mr. Bohnet had a subcontractor who supplied reinforcing steel for him,—the Pacific Coast Steel Company?

A. Yes. Pacific Coast Steel Company placed all the steel on the job, both inside and outside. [1384]

Q. Starting at the top, with the District, then comes Six Companies, then comes Mr. Ball, then comes Mr. Bohnet, then comes Mr. Talbot, then Pacific Coast Steel Company; then, off to one side, there, you had "Excavating and Grading, McKinley"?

A. Yes; but he was not under Mr. Talbot or Mr. Ball.

(Testimony of Thomas Moore Price.)

Q. No. We are switching over to another branch of the family tree now. We are now talking about Mr. McKinley. Mr. McKinley was the man who was to do the structural excavation, wasn't he?

A. I believe that is correct.

Q. And the structural excavation that was called for, on those schedules of August 9th, was not completed, with respect, at least, to the Golden Gate Structure,—overhead structure,—by December 1, 1934? A. No, sir; I don't think it was.

Q. The other day you testified, as I understand it, that the paving in some way had control of the time that Six Companies could finish this work. Is it not a fact the only thing on the whole project which was controlled in any respect by tunnel operation was the half mile, approximately, of highway from the west portal down to somewhere near Station, I think you called it, 78 on your schedule, a distance of some 3000 feet from the west portal where, under the specifications, there was a provision for putting the tunnel muck into the embankments on the highway? A. Yes.

Q. So that all the rest of this highway, from Broadway up to the point where you had to put tunnel muck, could have been paved at any time that the grade was completed?

A. Yes, it could have, subject to weather conditions.

Q. Before that, all the summer of 1935, Mr. Price, how was the weather during that summer?

(Testimony of Thomas Moore Price.)

A. As I recall it, it was a good summer.

Q. You did not do any paving then, did you?

A. Yes. We paved the Old Tunnel Road, I believe. We had a portion of the road leading up [1385] to the Old Tunnel,—which is not shown on there in color.

Q. The Old Tunnel Road was set back, by reason of the excavation for the project, somewhere——

A. Well, it shows the two there.

Q. Yes?

A. This road here, up the hill, just above the yellow portion on Exhibit "P."

Q. Just above the Old Tunnel Road shown on Defendant's "P",—that is the light colored line that runs along, meanders up the hill—a winding, narrow, old road? Now, just above the Pacific Gas and Electric Substation on, I will call it, the north side of the road, for about—what was it,—1000 feet; something in there?

A. It was nearer 1500 feet.

Q. Well, there was about 1500 feet of tunnel road there was moved back because of the grading below; it had to be set back further into the hill—is that correct? A. Yes.

Q. That was a travelled road at that time?

A. Yes.

Q. And part of your duty, under the contract to maintain detours and travel over existing roads, was it not?

(Testimony of Thomas Moore Price.)

A. Well, to a limited extent. I don't think it was our duty to maintain the detours all the way over the hill and through the tunnel to the east end. I think it was only a portion where our work was going on.

Q. Only within your work; and this 1500 feet was a part of your work; and, while you were doing your work, the travel had to be maintained over that road, did it not?

A. Yes; some of the time, that Old Tunnel was blocked by a slide, and all the travel was diverted to the Fish Ranch Road.

Q. That was something you had nothing to do with; that slide that filled up the Old Tunnel was some time in the fall of 1935, and for several months during 1935 it was closed? A. Yes.

Q. During that period, this 1500 feet of Old Tunnel Road was paved, was it not, during 1935,—the summer? A. Yes.

Q. So, when the Old Tunnel Road was reopened, after the cave that [1386] occurred in that tunnel, your work was done on that 1500 feet? A. Yes.

Q. It is also true that, in that same year, from the west end of the project down to where it intersects with Broadway, you completed paving about—How many lineal feet would there be there?

A. Well, I am unable to say, or to express it, in lineal feet, because there was a large intersection of the road leading up to the tunnel. I imagine,

(Testimony of Thomas Moore Price.)

around 1000 feet was paved; but the intersection had to be regraded and paved. That was the principal work.

Q. And the intersection was one which the travelling public,—the people using Broadway going out to Berkeley and to Claremont and south on the Fish Ranch Road,—used; it was a heavily-used piece of road; and you paved about 1000 feet, at the west end of the project, to connect with the intersection, so people could use that? A. Yes.

Q. Other than that, there was no paving done on the job in 1935?

A. No; there was not; there was some temporary paving on the west end——

Q. Temporary paving——

A. At the east end.

Q. Detour paving? A. Yes.

Q. Which you were required to do, under your contract? A. Yes.

Q. All the travel that came over that road,—the Tunnel Road,—from Walnut Creek into Oakland, had to pass over the construction which was going on in the bottom of the canyon there; and you had the Fish Ranch Road on one side and the Old Tunnel Road on the other, and your work was between the forks of the "Y" there, was it not? A. Yes.

Q. A very tight place to work? A. Quite.

Q. Your August 9, 1934, schedule shows that you completed—that you planned to do all the paving,

(Testimony of Thomas Moore Price.)

from the west end of the job to Station 75, in 47 days? Do you recollect that? [1387]

A. No; I don't recollect that, but, if the schedule states it, that is all I know.

Q. That work was not done in any 47 days or any other days in 1935, was it?

A. I do not think so.

Q. The fact that you were falling behind in the driving of the tunnels had nothing whatsoever to do with the delay of the paving from Station 75 west to Broadway, did it?

A. Yes; it had its effect. The job was not acceptable, in part; it had to be accepted as a whole, which included the tunnels as well as all the outside work; and, due to the fact that the pavement could not be completed entirely from the tunnel work until enough muck had been received from the tunnel to make those fills, it was impractical to do the paving at one time, because the cuts in the winter of 1934 and '35 on the west approach, and also some of the fills on the west approach hill, had slid in the highway to a very large extent; and it seemed practical to me to put the paving off, if possible, on those fills and in those cuts, because it would be destroyed in the winter of 1935 and '36, and then we would have to replace it at the expense of the Contractor; it would be better to pave it as near as possible at the end of the job, in order to save this destruction by the slides; and the Engineer would not let us move

(Testimony of Thomas Moore Price.)

any dirt except the dirt which came down into the roadway section; we could not slope the sides to make them safe.

Q. You got paid for whatever slide material you moved?

A. Whatever came into the roadway section.

Q. Mr. Price, isn't it a fact that what you had in mind about not doing that paving was you did not want to haul over it with your construction operations and so on; you wanted to wait until you were done, so you did not have to maintain the paving during this period of time?

A. That had some effect on it. That was not the entire cause. [1388]

Q. That had quite an important effect?

A. No; I don't think it was quite important. We planned on hauling the material for the concrete up the Old Tunnel Road and then over the new road.

Q. There was really no particular reason for failing to put in the paving, except you thought it would be wiser to wait until the end of the job to do it?

A. Yes; I thought it would be wiser; and I thought we would do the paving all at one time.

Q. If you put the paving in and slides would come down on it and you would haul the slides away and the pavement would have still been there, —just the way they do along the state highways all over the state?

(Testimony of Thomas Moore Price.)

A. Well, I noticed, in the last slide recently out there, the pavement was quite well chewed up when they took the slide out. It would depend on the man who was taking it out, to a large extent.

Q. If it were done carefully and not with WPA labor, you could take it out without chewing up the paving? Now, the pavement specified is an oil macadam, Mr. Price—that is true, isn't it?

A. Yes.

Q. You said that temperature controls pavement laying?

A. It is my impression that section of the specifications has a reference to temperature.

Q. Isn't it a fact, Mr. Price, that the specifications provide for two types of oil macadam pavement: one is a hot oil pavement, of which there is a temperature control; and the other is a cold oil emulsion, which could be laid in winter or stormy weather? I refer you to Section 17, Page 32.

A. Yes, I think that is correct—I don't know if the page is correct.

Q. My question correctly states the fact with respect to the specifications; one method was the hot oil method, which is proper to use in warm weather; and there is also an oil emulsion method, which could be used in cold weather—is that not true?

[1389]

A. That is apparently what the specifications state.

(Testimony of Thomas Moore Price.)

Q. So, there was a flexibility provided by the specifications that would permit you to put down oil pavement in accordance with the specifications at any time that you could get a subgrade that was hard enough to put it on; isn't that true?

A. Yes. It is my impression, however—my recollection, I should say, that, from talking that over with the District Inspectors, the oil emulsion pavement was not contemplated for the entire job but only the necessary work in the winter season when the other work could not be performed, and that, in any event, it would be necessary to have a hard subgrade before any kind of pavement could be laid on it.

Q. That was the reason it was in the specifications; so, if it was necessary to finish up the work, —the road work outside, in the winter, —it could be done at any time between storms?

Mr. Marrin: I object to that part of the question that says: "That is the reason it is in the specifications." He cannot possibly answer that.

Mr. Tinning: Well, he is an engineer.

Mr. Marrin: Well, he did not draw the specifications.

Mr. Tinning: I will withdraw the question.

Q. Is it not a fact that, under the specifications, the Contractor had the option of putting in either hot oil emulsion in the summer time or, if he could not comply with the temperature requirements, he would put in a cold oil emulsion?

(Testimony of Thomas Moore Price.)

A. I did not so understand that.

Q. You did not so understand it?

A. No; I did not understand—I thought it was a question of extent, to the best of my recollection.

The Court: Q. Briefly, what is the cost differential between the two forms?

A. I am unable to give you any difference, your Honor. I don't know whether there is any particular difference or not. [1390]

Q. Both equally satisfactory, are they?

A. Well, personally, I don't like either one of them.

Q. Well, I did not ask you that.

A. I guess they are equally unsatisfactory.

Q. I had in mind, from the viewpoint of the Contractor; one is as good as the other?

A. I wouldn't say the cold emulsion is as good as the hot—

Q. I did not think so, myself. That was the only reason I asked you.

Mr. Tinning: Q. Six Companies bid just the same price for either method, didn't it?

A. I think so.

Q. If you will look at Subsection 1 of Section 17 on Page 32, "Penetration Oil Macadam Pavement," then:

"Description.—A Penetration Oil Macadam Pavement shall be constructed at locations and of widths shown on the plans, and as directed consist of two (2) courses, namely, a water-

(Testimony of Thomas Moore Price.)

bound base course consisting of rock and screenings, compacted by rolling and watering and of a depth not less than six inches (6″) after final compacting, and a penetration oil macadam top course two inches (2″) in thickness after compacting, consisting of rock and screenings compacted by rolling and bound and sealed by applications of hot road oil or cold emulsified road oil, as hereinafter specified."

A. I might correct you there. You said "waterlogged." I presume you meant "waterbound"?

Q. Thank you. The point of this is, Mr. Price, that you could use either hot or cold oil method, could you not? A. I believe so.

Q. How much material did Six Companies take out of the west portal building excavation?

A. I am unable to give you the exact figures. I have a recollection as to approximately around 40,000 [1391] yards; but I would not be sure.

Q. Well, it is a fact, is it not, the neat excavation required for buildings was approximately 20,000 yards?

A. I am unable to say exactly. I think it is something around that figure, to the best of my recollection.

Q. You think you took out about twice as much?

(Testimony of Thomas Moore Price.)

A. That is my memory.

Q. How much material did you take out of the west portal approach cut, in cubic yards?

A. I am sorry; I thought you were talking about both the buildings and the approach cut.

Q. Well, I wasn't. Where did you put the material that came out of the west approach cut and the west portal building cut?

A. I am not sure where it went; I was not there at that time.

Q. As a matter of fact, it went into the half mile of road between the west portal, where your tunnel muck went also, did it not?

A. I could not say. I presume that it did. I think some of it was used to build a site for the blacksmith shop and the lumber yard, but I would not be sure; I do not know.

Q. Can you look it up and find out?

A. I don't know whether I could; I don't know whether I would find the record of it.

Q. Isn't there anyone in the engineering organization of Six Companies who knows where you put it,—the 40,000 yards of material that came out of that cut?

A. I probably could find out. I will try, if you wish me to.

Q. Isn't it a fact, Mr. Price, that there was 20,000 yards of neat excavation; it shows from the plan, in the west portal building?

(Testimony of Thomas Moore Price.)

A. I don't recall, Mr. Tinning. I don't have those figures very clear in my mind.

Q. Isn't it a fact that there was 31,000 cubic yards of excavation in the west portal cut, west of the portal building itself?

A. As I say, I would have to refresh my mind, from the records on [1392] it; I am not clear on it.

Q. Well, we will take that up later on. I would like to have you look it up at the recess, if you will, please.

You testified with respect to a conversation between Mr. Bechtel, Mr. Boggs and yourself, some time in May, in which ground conditions, you say, were discussed, and a question of an extension of time. Did you make any memorandum as to the date of that conversation?

A. No, sir; I did not.

Q. Or of the conversation itself?

A. No, sir; I did not.

Q. Is it not a fact that this conversation that you refer to occurred on the 21st day of May, 1935, shortly before the noon hour, on the front steps of Six Companies' office building near the west portal of the tunnel?

A. I could agree with you upon your statement that it occurred on the front steps of the office building. To the best my memory, it was about the middle of May; and it was, as I recall, about ten o'clock in the morning.

Q. Upon that occasion, Mr. Price, you recollect that Professor Charles Derleth, Jr., one of the District's consultants, was present.

(Testimony of Thomas Moore Price.)

A. He definitely was not there.

Q. He definitely was not there?

A. Not at our conference.

Q. You so testify?

A. Yes, sir. I will definitely tell you that.

Q. Was he present at any conference in May of 1935, at the west portal building, when you and Mr. Bechtel and Mr. Boggs and Professor Derleth were all present?

A. I don't recall. When I saw Professor Derleth out there occasionally and discussed—you know, like you pass the time of day with somebody you like—I asked about things in general,—nothing in particular; I had no particular conference, nor do I recall any definite conference with Professor Derleth at any time out there.

Q. Mr. Price, we are getting away from the subject. We are talking [1393] about a conference in which Mr. Bechtel and yourself and Mr. Boggs and Professor Derleth discussed certain phases of the work.

Mr. Smith: He said no such conference occurred. How can you be talking about it?

Mr. Tinning: Mr. Smith, I tried to make very clear then whether there is a misunderstanding about it. The witness has said he remembered some discussions with Professor Derleth about nothing.

Q. When you met Professor Derleth out there, did you simply pass the time of day with him, Mr. Price? A. Largely.

(Testimony of Thomas Moore Price.)

Q. Did not discuss the problems of your work at all? A. No; not that I recall.

Q. Never recalled discussing them?

A. I do not recall, except a fragment of one discussion with Professor Derleth, and I am unable to place the time it was; that was a discussion, to the best of my recollection, in the latter part of 1935.

The Court: Q. Was anyone present at that conversation?

A. I am unable to recall, your Honor—Mr. Boggs and myself were present, Professor Derleth.

Mr. Tinning: Q. Where were you when that occurred?

A. We were right in front of the District office, up there by the west portal.

Q. That was a couple of hundred feet west, let us say, of where this conversation you had in May was; but the office was nearer the portal than the District office?

A. Yes; and Professor Derleth was talking about the controversy that had arisen between the Six Companies of California and the District, and he advised Mr. Boggs that it had always been his policy to compromise with the contractor. That was the extent of it. I don't remember anything else about the conversation.

Q. You remember that, because it sounded good to you?

A. Yes, I do. It had an effect on me.

(Testimony of Thomas Moore Price.)

A. Yes, I do. It had an effect on me. [1394]

Q. Mr. Price, coming back to this May conversation, do I understand it is your positive testimony that Professor Derleth was not present at the conference to which you testified the other day, in which you said that Mr. Boggs told you you were entitled to an extension of time?

A. Yes; he was not present.

Q. He was not present?

A. That is, at the conference. I am unable to say he was not on any portion of the work; I do not know; I do not recall. He was not at the conference.

Q. At the time? A. At the time.

Q. Isn't it a fact that, at that time and place, Mr. Price, that Professor Derleth advised you and Mr. Bechtel that he considered it highly dangerous to leave such a large, long section of the tunnel supported by timbers, supported in that manner over the length of time that had elapsed, and he thought you ought to get your concrete started immediately?

A. No; I don't recall Professor Derleth ever telling me that at any time until after the cave-in of August 28, 1935.

Q. He did tell you that afterwards; you remember that?

A. Well, a lot of people told me; and he was there, and I presume he told me, also.

Q. Isn't it a fact, at the time and place of this conference that you have referred to, that Mr. Boggs

(Testimony of Thomas Moore Price.)

stated it was not imperative Six Companies required an extension of time, and that, before any extension of time could be granted, it would have to be approved by the PWA and the Board of Directors, and that, in order to get such approval, Six Companies would have to have a good and substantial reason for an extension of time, and that he, Mr. Boggs, knew of no reason for the extension and would not recommend it? A. No.

Q. Isn't it true that following, in the conversation, Mr. Boggs suggested that you defer your request for an extension of time until [1395] a short time before the completion, until it was then evident that Six Companies could not finish within the contract time? A. Yes.

Q. Isn't it true that, at that time, Mr. Bechtel stated, in your presence, to Mr. Boggs that he felt it was necessary to put in a request at that time as a matter of record, and that he was going to do so?

A. I don't recall the statement regarding the matter of record; I know he stated he felt it was necessary to put in a request at that time.

Q. Isn't it a fact that, at that time, nothing was said whatsoever about ground conditions being different than you had anticipated?

A. I would like to have the question over again.

The Court: Read the question, Mr. Reporter.

(Pending question read by the reporter.)

The Witness: A. No; that is not a fact.

Mr. Tinning: Q. You stated that you met Mr. Boggs in December, 1935, and had some conversa-

(Testimony of Thomas Moore Price.)

tion with him in connection with time extension. Have you any notes or memoranda of the date?

A. No, sir. I did not keep records of conversations in my diary. There were so many of them I would not have had time to do much else. I did not keep a record of that particular conversation; but I remember it very well, as to what happened. I cannot place the exact location; but my best recollection is it was near the east portal of the tunnel.

Q. You fix the time roughly as December, 1935?

A. Yes.

Q. As I understand it, you had been advised to discuss the matter with Mr. Boggs on a noncontroversial basis? A. Yes.

Q. You asked him if he considered that the paving to be done in the spring of 1936 would be a legitimate cause for granting the Contractor a time extension?

A. Yes; I asked him that in connection with the slides in the cuts and sinking of the roadway as it already had been completed,—the three are practically tied together: the roadway, grading and paving; and Mr. Boggs told me he [1396] thought it was an adequate reason for time extension, and would be noncontroversial.

Q. For many years, you have been a highway contractor, have you not?

A. Well, I have worked for one.

Q. You know that grades through hills always

(Testimony of Thomas Moore Price.)

have slides in the wintertime, especially on new construction?

A. It is normal, I think, in most ground.

Q. And the contractor anticipated that when he made the bid on this job, didn't he?

A. I am unable to say.

Q. Well, that depends on how you bid on a job of this kind? [1397]

A. It would entirely depend on the conditions surroundings the job, the slope which the engineer specified in his plans, the slope of the banks, the nature of the ground, itself, as to whether the engineer would try to correct the slide then or just wait until it came to him, all of those factors; it is difficult to give an answer to it.

Q. Isn't it true, with all of your knowledge of what might happen, as an engineer, handling this work of construction, where you had estimated this job and put in a bid, where you knew you were going to have a number of months to do this work, at least one winter season, and possibly two, required to do the work, that you could anticipate there would be slides?

A. I think it would be a reasonable anticipation.

Q. And there was also the settlement of fills?

A. I do not think that would be so—

Q. Not so material a fact?

A. Not so material a fact as figuring slides.

Q. Something that might occur?

(Testimony of Thomas Moore Price.)

A. If a fill is properly designed it will not slide in unless the foundations are placed in wrong.

Q. Mr. Price, isn't it a fact that you knew when you went on this job that there would be slides and that the contract called for the removal of the slides by the contractor, and he got paid for it?

A. No, I do not recall that was the condition at the time I went on in September, 1934.

Q. You know you got paid for removing the slide material?

A. Yes, we got paid for the material that came into the roadway cut.

Q. You knew when you had this talk with Mr. Boggs in 1935 that the contractor had written this letter of July 26th, this letter of August 23rd and August 28th, 1935—you knew about those letters, didn't you? A. Yes. [1398]

Q. In which the contractor was claiming the right to an extension of time? A. Yes.

Q. And you knew that the District claimed that the contractor's delay in going on with the work was entirely due to the method that the contractor had used in driving the job?

A. Yes, it is my impression that is what the District claimed.

Q. You knew that that was the controversy, did you not? A. I think so.

Q. You did not apply in writing for an extension of time in December, 1935, did you?

A. No, not that I recall.

(Testimony of Thomas Moore Price.)

Q. And there was no written application for an extension of time made again following the one that was made in June, 1935—the Six Companies never made another application for extension of time until the 10th of May, or 8th of May, 1936?

A. I believe not. However, it is my understanding that an attempt was made to write such a letter, and that there was a conference between Mr. Boggs and Mr. Hindmarsh, and Mr. Boggs again stated it would be unwise, in his opinion, to apply for an extension of time at that time, and would prefer to have us do it at the end of the job, and Mr. Hindmarsh agreed to his opinion. That is hearsay with me.

Mr. Tinning: Your Honor, then, I move that that go out.

The Court: It may go out.

Mr. Tinning: Q. Mr. Price, do you remember a visit to Mr. Boggs' office on December 24, 1934, with Mr. J. Q. Barlow?

A. I remember going to Mr. Boggs' office with Mr. Barlow at one time, but; I am unable to approximate the date exactly.

Q. Did you make any notes of that visit?

A. No, I did not. I wrote a memorandum about it. I could refresh my memory about that.

Q. Do you mean a memorandum?

A. Inter-office memorandum.

Q. Does that state the conversation that you had there at that time? [1399]

(Testimony of Thomas Moore Price.)

A. I don't recall whether it states the conversation or not.

Q. Have you that with you?

A. No, not with me. I am under the impression that we have a memorandum, but I am not positive.

Q. Will you bring that memorandum when you come to court this afternoon?

A. If I can find it.

Q. In discussing engineering service on this work with Mr. Marrin, as I remember your testimony, you told him that the District Engineer did no work inside of the tunnel and all of the work outside of the tunnel.

A. I said the District Engineer did no work in the tunnel that was of any benefit to us, as far as I knew.

Q. And that they did work outside the tunnel that was of great benefit to you?

A. They set the lines and grades on the outside work.

Q. They set in the tunnel, did they not, a concrete monument at varying distances behind the excavated face which was 24 inches square and about 30 inches deep, which set about the center of the tunnel; isn't that correct?

A. I say they set some monuments back behind, Mr. Tinning, but I would not be positive as to the size or what the monuments consisted of. I presume they were intended to be a permanent monument in the tunnel.

(Testimony of Thomas Moore Price.)

(A recess was here taken for the Grand Jury.)

(After recess:)

Mr. Tinning: Q. Mr. Price, it is a fact, is it not, that following your conversation with Mr. Boggs on December 24, 1934, Christmas Day, and the next day December 26, 1934, you wrote the first letter requesting additional engineering, that letter of December 26, 1934, which is in evidence as one of the exhibits in this case?

A. Yes, I recall I wrote him immediately after that conference, at his request, but I do not recall just now at the moment whether that was the first letter, or not. [1400]

Q. Do I understand you to state now that Mr. Boggs requested you to write the letter on the engineering?

A. Yes, the letter describing the conference with Mr. Barlow.

Q. Is it not a fact that at that conference that Mr. Boggs told you that he would continue to give you the same kind of engineering that you had had up to that time, the center line, the grade in the center of each tunnel, and Mr. Barlow said, "If it was my job I would quit"?

A. Yes, that sounds like him, but I don't recall his saying that.

Q. Isn't it a fact that you got up and went out after that, and then you wrote the letter the next day, or the next business day?

(Testimony of Thomas Moore Price.)

A. My recollection is that Mr. Boggs asked me to—I may be confused on the letters. I would like to see the letters so that I could refresh my memory. But it is my recollection Mr. Boggs asked me to describe what I wanted him to do on the lines and grades.

Q. I will show you my working copy of the letter of December 26th to refresh your recollection. I am referring now to Defendant's Exhibit BB, now in evidence. It is a fact that this letter was written on the next business day following your conference with Mr. Boggs, is it not? A. Yes.

Q. You now testify that he requested you to send him the letter? A. Yes.

Q. And then when you left the office when Mr. Barlow advised you to quit, you wrote this letter of December 26, 1934, and Mr. Boggs replied to that letter on the 3rd of January and told you that he was not going to do any additional engineering, he was going to continue to give you the engineering just as he had before. Do you remember that? It is Defendant's Exhibit CC.

A. Mr. Tinning, I have a recollection of such a letter being received, I don't recall the date. [1401]

Q. And he said,

"With respect to your outline of engineering work which you desire the District to perform in connection with the establishment of lines and grades, I wish to advise you that the District Engineer will continue to establish lines

(Testimony of Thomas Moore Price.)

and grades on a single base line in each tunnel, and that any additional points which your working crews require should be furnished by your own engineering organization, as required by the specifications".

Now, in the face of Defendant's Exhibit CC, which you received on January 3, 1935, is it still your opinion that on December 24, when you and Mr. Barlow were in Mr. Boggs' office, he asked you to write him a letter?

A. Yes. He asked me to write a letter, asking me to describe what we wanted in lines and grades in the tunnel, and that is a letter giving him the grades and lines which we did wish to be established.

Q. As a matter of fact, the contractor had an engineering crew working on this work before December 24, 1934, did it not?

A. We had had one since I was there, and I understand prior to that date.

Q. And after you got these letters you continued to keep that engineering crew at work, did you?

A. Yes.

Q. You did not quit?

A. We did not quit. I could not agree with the letter you mentioned of January 3, in which Mr. Boggs said he would continue to set lines and grades, because they had already been set.

Q. You were still driving the tunnel, weren't you?

(Testimony of Thomas Moore Price.)

A. Yes, but after you set something once you cannot set it again, it is already set.

Q. Didn't he follow up along in the tunnel?

A. I don't know, we could never use his work.

Q. You did not make any observation to determine what kind of monu- [1402] ments he had in the tunnel?

A. His work did not affect us, at all; he only worked where we had completed the tunnel.

Q. Will you answer my question? Did you observe any monuments in the tunnel?

A. I observed some quite a ways back of where we were working.

Q. Those were concrete monuments placed in the center of the tunnel, at the center line of the tunnel, approximately 24 inches by 24 inches, and about 30 inches deep, sunk down into the subgrade of the tunnel?

A. I didn't notice the size, but they were placed in the completed section of the tunnel as far as excavated.

Q. Didn't you ever look at any?

A. I don't recall measuring them or looking at them, but I am of the impression they were about 6 by 6 inches.

Q. That is your recollection?

A. Yes, they were all behind. They were not up near the excavation.

Q. Now, I am not talking about how far behind they were, I am talking about how big they were,

(Testimony of Thomas Moore Price.)

Mr. Price. You were able to observe they were 6 by 6, you say?

A. Yes, as a matter of fact I think they were buried; there was quite a distance buried in the ground.

Q. Who buried them?

A. The District engineer.

Q. Did he cover them up after he buried them? Do you mean he covered them over with dirt?

A. They would naturally be covered with water down low; I think most of the time they were covered with water.

Q. As a matter of fact, your own engineers based their operations ahead on those monuments, did they not? A. I do not think so.

Q. You do not think they did? A. No.

Q. Do you know?

A. No, I could not say definitely.

Q. Who was the engineer in charge of your engineering party in 1934, 1935?

A. Well, pardon me, you said two years, didn't you?

Q. We spend a lot of time getting my questions corrected for you. My question is, in December, 1934. A. I think Mr. Shaw. [1403]

Q. And Mr. Shaw continued through January, February, March, April and May, June and July as the head of the engineering department?

Mr. Smith: Of what year?

A. He continued up until 1935, I forget the month.

(Testimony of Thomas Moore Price.)

Mr. Tinning: Q. When did he leave?

A. I don't remember.

Q. How long was he with you?

A. I would estimate approximately a year, to the best of my memory.

Q. Who did the engineering after Mr. Shaw left?

A. Mr. Hall.

Q. Do you know whether Mr. Hall used the monuments set by the District in the tunnels to start his work, as he went ahead to do the work as provided in the contract?

A. No, he would not need to use those.

Q. He did not need to? A. No.

Q. You know that is a fact?

A. Yes, I believe that to be a fact.

Q. Do you know it is a fact?

A. No, I don't know it.

Q. You don't know how much about it, do you?

A. Yes, I think I know some about it.

Q. Did you ever see one of those engineers that worked for you start a base line in that tunnel?

A. Yes.

Q. Where? A. At the portal.

Q. At the portal? A. Yes.

Q. And on what date?

A. Soon after I came on the job, in the latter part of September.

Q. Just as you were going underground?

A. Yes.

(Testimony of Thomas Moore Price.)

Q. Beyond that time do you know where they got their base lines?

A. Well, I don't understand, quite.

Q. Do you mean to say, Mr. Price, that your engineers went to the mouth of the tunnel at the place you said you set your base line and continued to work every time they wanted to run a line in the tunnel after they got clear back?

A. Oh, no, they set their lines [1404] in the tunnel; they were on the bench marks.

Q. What were the bench marks on?

A. On the timber.

Q. Those timbers you told us moved quite a bit?

A. Yes.

Q. Did the bench marks move with them?

A. I presume they did. By that time the next point had been established. This was in the heading, not behind.

Q. Did you ever give your own engineers a single direction as to how they should do their work?

A. No, I did not.

Q. As a matter of fact, you don't know what they used for a base line in those tunnels, do you, of your own knowledge?

A. Well, I understand they used the base line outside of the tunnel.

Q. Do you know of your own knowledge what your engineers used as a base line in the tunnels?

A. Not of my own knowledge, No.

(Testimony of Thomas Moore Price.)

The Court: We will take a recess now until two o'clock.

(A recess was here taken until two o'clock p. m.)

[1405]

Afternoon Session

THOMAS MOORE PRICE,

Cross Examination (continued)

Mr. Tinning: Q. Mr. Price, did you find the memorandum of your conversation with Mr. Boggs, in December of 1934?

A. Yes. It was not as long as I thought.

Q. This memorandum of discussion is that

"Mr. Barlow and I discussed the matter of tunnel engineering with Mr. Boggs, and I feel somewhat weakened his position. At any event he asked for plans and descriptions of the work we desired the District to do, which has been done. If I hear nothing from him soon will push the matter further."

Well, this memorandum was apparently written on December 28, 1934. When you said, "which was done," you meant you had written a letter on December 26th? A. Yes.

Q. This memorandum you made of a conversation was December 28th,—the date it bears,—when you dictated both, to someone in the organization, as to what you had done on the 24th and the 28th?

(Testimony of Thomas Moore Price.)

A. Yes. I don't remember the date the 24th, exactly.

Mr. Tinning: Gentlemen, thank you for producing the two letters that I asked for. I agree with you that they are immaterial.

Mr. Marrin: All right.

Mr. Tinning: Q. Mr. Price, during the noon hour did you have a chance to check over the records of your organization to determine the yardage that we were discussing before lunch?

A. Well, not a very good chance; I found we did not have the records at the place where most of our records are kept now. I asked our auditor to go down to the other office; and, in the short time he had, he found the indications were that the District had paid us for approximately 42,000 yards of the west portal approach cut, and that there were approximately 26,000 cubic yards in the building [1406] which was excavated, in the lump sum. I, personally, did not get a chance to look at the records here, myself.

Q. Is it your recollection, Mr. Price, that, in addition to 42,000 yards that you were paid for, there was other material at the west portal on which the District did not pay you, by reason of the fact you excavated beyond the line that the District's plans called for?

A. I am not clear on that point. I presume that is correct.

(Testimony of Thomas Moore Price.)

Q. Well, you remember the correspondence that we had here with respect to slides on the west portal cut? A. Yes.

Q. In which, as I recollect, roughly, the Contractor was seeking to be paid for additional material there, and, as I recollect it, the District said the only pay material was the material that would come within the prism that is shown on the plans?

A. Yes.

Q. That 42,000 yards you were paid for there: can you tell us where that was placed?

A. To my personal knowledge, I don't know. I think most of it was placed in the fill at the west portal.

Q. When you went over those figures, Mr. Price, did you distinguish between material that came out of the west portal building and what came out of the west portal cut—rather, those two separate pay items? A. I attempted to explain that.

Q. Was the 42,000 the total of what was taken out?

A. That is the point I am not clear on. I think that much was taken out and paid for on the west portal approach.

Q. Isn't it true, in the building, that 26,000 cubic yards was taken out and paid for by the District? A. That is what our record indicates.

Q. So, in addition to 42,000, there was 26,000, or that would be 68,000 cubic yards of material that came out? [1407] A. Possibly, yes.

(Testimony of Thomas Moore Price.)

Q. Well, you add them together? That is what it indicates.

A. I was not there at the time, Mr. Tinning, and I have not had a chance to thoroughly work the thing out. I think that is correct.

Q. From the data that you had up to this time, which you got from your auditor,—the figures we just discussed are correct; and you were paid for 68,000 cubic yards of material moved at the west portal excavation,—the 26,000 that came out from the building, and 42,000 that came out west of the building in the approach cut?

A. Yes. I would like to make it clear, though, that was two different kinds of payment; we got no payment as such for the yardage of dirt out of the portal building; that was included in the lump sum price for the building, as I recall it. We did get paid by the yard for the excavation up to the building, I believe.

Q. Mr. Price, the thing we are trying to arrive at here is a reasonably accurate estimate of the yards of material that were removed from the west portal, not how you were paid for it; but the District's records, I should say, coincide with your statement, and it shows there was approximately 68,000 yards of material moved from that place and placed somewhere else. Now, I am asking you where that 68,000 yards went.

A. Well, I did not see it moved; but I would presume it went in this roadway fill west of the tunnels, and in the fill for the plant.

(Testimony of Thomas Moore Price.)

Q. How much would you say went into the west roadway fill?

A. Oh, I wouldn't be able to say. I would have to guess at it. I would say approximately 80 per cent.

Q. Approximately 80 per cent?

A. 75 to 80 per cent.

Q. Let's take it this way: Let's say 75 per cent of it, and 25 per cent of it went into the fill that you made for your muck bunkers and the railroad yard and the blacksmith shop—Is that about right?

[1408]

A. All these figures of mine that I am giving are guesses. I don't know. I am just estimating. That would be my estimate at the moment.

Q. Yes, your estimate. Of that 75 per cent of material in the fill, 75 per cent of 68,000 would be in the neighborhood of 51,000 cubic yards of material that went into that roadway fill from the west portal building and west portal approach cut?

A. Approximately, yes.

Q. You told Judge Roche the other day, in testifying, when he asked you a question regarding the quantities that you figured about 170,000 yards of the tunnel material was required to make the embankments in the portions of the roadway west of the tunnel?

A. I said our engineers figured it.

Q. Well, you took that from your records. You were project manager?

(Testimony of Thomas Moore Price.)

A. Yes; the records say that.

Q. You said you thought, from what you took out of the tunnel, that you had approximately 37,000 cubic yards more material in the tunnel that you required to fill those embankments west of the tunnel?

A. Well, that, you see, was the basis of moving the dirt from the tunnel, which we did not do and did not claim—You mean the portions we worked, or the portions—

Q. You used the figures—

A. That was all estimates of approximately 207,000 neat yards in the tunnel, regardless of who excavated it.

Q. Regardless of who took it out? A. Yes.

Q. So that, at the beginning of the job, when you were setting up the balancing of the materials, where you would place them, you planned that you would have approximately 37,000 yards of extra material from the tunnel that you would have to place somewhere other than in the embankments?

A. Yes. [1409]

Q. And the 170,000 cubic yards required for your embankments—

A. My understanding is we had—

Q. Well, that was your testimony.

A. I am trying to explain what I meant to say at that time, if I said it or not. My understanding is our engineers stated we had 170,000 yards of material from the tunnels that had to be compacted in

(Testimony of Thomas Moore Price.)

this fill on any excavation for which we received pay quantities,—that is, of the yards that are not included in the 170,000 yards.

Q. That was because you had to take your material out of the tunnels as a lump sum bid?

A. Yes.

Q. So, you did not get paid for that yardage?

A. Yes.

Q. You had a space in the fill to take care of 170,000 cubic yards?

A. Which would not be compacted from any other price.

Q. Yes. We are not talking about price now. We are talking about yards. You had planned, in that 170,000 yards, or the space required for 170,000 yards—you had already placed, before you started any tunnel excavation, 51,000 yards from the west portal building and the west portal cut?

A. No. That was the point I was trying to explain to you: This material from the west portal cut, the District paid us by the cubic yard, and on any material which the District paid us by the cubic yard, it is my understanding that the compaction was figured in the price which we bid to the District; so that the only portion of the 170,000 yards which went into the building was that yardage for which the District did not pay us on a bid price but on a lump sum price. On that basis, the material from the building and from the tunnel would

(Testimony of Thomas Moore Price.)

be in the 170,000 yards, but not the material from the approach cut.

Q. How many thousand yards of material did you have in the tunnel altogether?

A. You mean that we excavated?

Q. Yes. A. I don't recall.

Q. Well, I will show you: [1410]

Q. I will show you Defendant's Exhibit N, that is the August schedule, and, incidentally, the February schedule figure that I am referring to is exactly the same, 230,000 cubic yards was what you estimated in your schedule would be required for the fill in the tunnels, from Station 106 to 76?

A. I think that is 78.

Q. I did not read them correctly; from station 106 to station 78. Between those stations is where the tunnel fill went, is it?

A. Yes, approximately.

Q. So that by the estimates that you hold there now it appears that you had 230,000 cubic yards of material to deposit from the tunnel in the fills. Is that correct?

A. This estimate indicates that, but it is not an estimate in the first place, but it is a proposed progress schedule which indicates that. However, I studied the estimate, itself, and I learned they only estimated 170,000 yards to be compacted rather than 230,000 cubic yards to be compacted. I think

(Testimony of Thomas Moore Price.)

this 230,000 cubic yards compacting figure is in error from that standpoint.

Q. It is an error of the Six Companies and it was sent to the District on two separate occasions, one on August 9, 1934, and again on February 12, 1935.

A. Might I say further, Mr. Tinning, the error is not an error in yardage, but an error in the amount to be compacted. I think the yardage is supposed to be the yardage to be moved from the tunnel, regardless of what was to be done with it.

Q. The 170,000 cubic yards that you referred to in your testimony means cubic yards of material in place in the highway embankment fill?

A. That is my understanding.

Q. That is what you testified to, that is what you were referring to, in place? A. Yes.

Q. How many yards of material in addition to the 170,000 cubic yards that you have referred to were necessary to place in that fill [1411] to build it according to the plans and specifications from station 78 to station 176?

A. I am sorry, I do not understand you.

Q. Read the question.

A. I am unable to say, I didn't know that there was any.

Q. There was not any more?

A. I don't know that.

Q. When you testified here you testified that it took 170,000 cubic yards of material to build the

(Testimony of Thomas Moore Price.)

fills from station 106 to station 78. Wasn't that your testimony?

A. That is not stating it exactly as I stated it. I had estimated that it would take 170,000 cubic yards to make the fills at the west portal of compacted material.

Q. Isn't that the same thing, 170,000 cubic yards measured in place in the embankment.

A. Yes.

Q. So it took 170,000 cubic yards in place to build that road? A. I am unable to say.

Q. And of that 170,000 cubic yards you have now testified you supplied 51,000 from the west portal cut and the buildings? A. No.

Q. What did you supply?

A. My understanding of the 170,000 cubic yards is that that yardage, over yardage paid for by the district as a unit price.

Q. Mr. Price, let us forget all about the price.

The Court: We are dealing in yards only.

A. I can answer it no other way. We had two separate payments to be paid for by the cubic yard; we bid on each by the cubic yard. In our bid we had an amount set aside for compacting. We did not have any amount in that for compacting the dirt from the tunnel and from the buildings, and we had to estimate that and put it in addition. That is the 170,000 I am speaking of.

Q. How many yards went into the fill, do you know?

A. No, I am unable to say. [1412]

(Testimony of Thomas Moore Price.)

Q. Who does know, if you know?

A. None of our people know, I do not think. I do not think it was ever estimated.

The Court: Proceed. I see I have failed.

Mr. Tinning: It is modest to say that I have failed tremendously at this point by seeing if we could get anything.

Q. Your neat section you testified, in response to Judge Roche's question last week, the neat amount of material, you used the words, required in the west portal of the tunnel to the point on the west where you ceased to use the tunnel muck for embankment fill was 170,000 cubic yards. You had a design for doing all that you had to build, didn't you? A. Yes.

Q. If you cared to make that embankment thicker or bigger in wasting material you had a right to do so so long as you stayed on the district right of way, didn't you?

A. Provided it met with his approval.

Q. As a matter of fact, that is what you did there, is it not? A. Yes.

Q. That embankment is considerably wider at the base and at the top than the neat section that required 170,000 cubic yards? A. I think it is.

Q. So that you did mean what you had to put in there was 170,000 cubic yards and you had to use that from somewhere in that neighborhood as an economical basis of operation? A. Yes.

Q. Now, of that 170,000 cubic yards, before you started excavating the tunnel, you had placed in

(Testimony of Thomas Moore Price.)

the embankment 51,000 cubic yards. Perhaps we do not understand each other, Mr. Price.

A. I am afraid we don't.

Q. It is evidently my fault. You certainly made the building excavation before you dug anything out of the tunnel, didn't you? A. Yes. [1413]

Q. And you made the west portal cut before you dug out the tunnel? A. Yes.

Q. You had to put that earth some place, didn't you? A. Yes.

Q. You carried it down on your railroad and put it into this embankment?

A. I don't know that. I was not there. I don't know how it was moved. I believe by a truck.

Q. Mr. Price, how many cubic yards of earth were excavated by Six Companies in each lineal foot of tunnel excavation?

A. 42 to 43 yards.

Q. Isn't it a fact that the records show 45?

A. I do not think so. My memory is 42, between 42 and 43.

Q. 42 or 43?

A. Somewhere in that neighborhood.

Q. Your neat section was 35.6 cubic yards per lineal foot of excavation: is that correct?

A. Yes.

Q. You think you had about 20 per cent excess?

A. Yes.

Q. Would you quarrel with the District record if it showed it was 24.6 per cent?

A. I do not quite understand.

(Testimony of Thomas Moore Price.)

The Court: Q. Would you approve their figures as reasonable or not?

A. You mean the excess excavation was 24.6?

Mr. Tinning: Yes, would you quarrel with the District figures?

A. I do not want to quarrel. My memory is it was 43 yards, and I could not change them unless I could refresh my memory.

Q. What I have in mind is that you had approximately, you say you had 43 cubic yards per lineal foot. Will you figure out how much earth you had out of the tunnel on April 1, 1936 in cubic yards? There was 3,193 feet completed on April 1st, fully excavated. A. 3,193?

Q. Yes. A. At 43 yards?

Q. At the west portal.

A. I get 137,300 cubic yards, approximately.

[1414]

Q. And you had 51,000 yards out of the west portal buildings and the west portal approach cut. Will you add those two?

A. Approximately 188,000.

Q. You only needed 170,000 to finish the fill?

A. Yes, Mr. Tinning, but you do not understand me, when I say the 170,000, it was excessive dirt that came from excavation paid for by the District as such.

Q. I confess I do not understand you, but the

(Testimony of Thomas Moore Price.)

fact is you required 170,000 yards to build an embankment west of the portal from tunnel material and by April 1, 1936 the material that had been placed in that fill and what had been excavated from the tunnel that you wanted to put in the tunnel, you had 188,818 or 18,818 more than you required to complete the fill on the west portal?

A. No, I cannot agree with the figures given, because I estimated we had only to compact 170,000 cubic yards; any addition to that we were paid for at the unit price; I don't know how much earth there was in the fill; I think that is probably where we are confused; I don't know the amount of dirt that was required in the fills. All I know is they estimated that 170,000 cubic yards would have to be compacted, on which we had not been paid for on the unit price of excavation.

Q. Under the specifications you were required to make the fill west of the portal out of tunnel excavation. You did not get paid for that, did you?

A. That is the yardage I am talking about.

Q. That is what made up the cut Under your schedule of August 9, 1934 you show that you expected to do the macadam pavement on the portions of the highway between station 75 and station 111 in 25 days, from October 5 to 30. That is correct, is it not? A. Yes.

Q. From April 1, 1936 to May 24, the completion date under the [1415] contract was 54 days, was it not? A. I would have to check it.

(Testimony of Thomas Moore Price.)

Q. Just add it, there are 30 days in April and 24 in May. A. April 1 to—

Q. April 1 to May 24. A. 54 days.

Q. Your estimate that you gave the District for doing that work was to be done in October, was 25 days; was the estimate unreasonable?

A. It looks a little short to me.

Q. How long do you think you should have to complete that 3,000 feet or 2,500 feet of oil macadam pavement?

A. I believe you might do it in a month.

Q. About a month. It was five days short?

A. Yes.

Q. All right, look at the schedule that you delivered to the District on February 12, 1935, and you will see where you take the 54 days as a proper figure, and you were going to finish on May 24.

A. Yes, but that includes cleaning up, etc.

Q. So that you think about 30 days is plenty of time to do that work?

A. Under the conditions I think it would be, without any delay.

Q. What subcontractor had the subcontract to do the paving on this job?

A. N. M. Ball & Son.

Q. Was it Ball who did the paving up on the old Tunnel road and down at the west end?

A. Yes.

Q. And that is all he ever did on that job?

(Testimony of Thomas Moore Price.)

A. All the paving.

Q. When was he relieved from his contract?

A. He was never relieved.

Q. He was still waiting around on June 13, 1936 to do that work?

The Court: Or did he leave the job?

A. He did not leave the job. He still had the subcontractor for him working on the structure at that time.

Mr. Tinning: I am talking about the Ball outfit, I do not consider that Mr. Bohnett or Mr. McKinley, or somebody else that [1416] had a subcontract out there under Ball. Ball, as I understand it, worked his own force on paving and subcontracted all the other work that he undertook to do under his original subcontract?

A. I think that is essentially correct.

Q. Is there anything fundamentally wrong with it? A. I do not recall at the moment.

Q. I would like to get it clear. We have been through the subcontractors and Mr. Ball was the first man employed by the Six Companies on the outside work—he had a contract for everything on the outside? A. Except the grading.

Q. McKinley had the grading and Ball had all the outside structures?

A. The portal buildings were subcontracted to another party.

(Testimony of Thomas Moore Price.)

Q. The portal buildings, under their own schedules, are not called outside structures, they are separate structures, so that the portal buildings K. E. Parker had, and McKinley had the grading, and Ball had all of the outside structures, I mean under your own designation. A. Yes.

Q. And all of the work that Mr. Ball's own outfit was doing was the paving on the tunnel road at the west end. Was there any paving done at the east end?

A. Nothing except the detour, as I recall it.

Q. When did Ball move off the job?

A. He did not move off the job.

Q. Was he waiting around there to finish the paving sometime in the summer of 1935 till the 13th of June, 1936, ready to go to work on this paving? A. Yes.

Q. Standing around all the time with his equipment and ready to go?

A. I cannot say about standing around. He was doing other work in the meantime.

Q. What was he doing?

A. He was contracting other jobs.

Q. You mean on outside jobs? A. Yes.

[1417]

Q. I mean on this job.

A. No, he was not doing anything except finishing structures on his subcontract.

Q. Somebody else's work on subcontract?

A. No; Mr. Balls'.

(Testimony of Thomas Moore Price.)

Q. McKinley had a grading contract, and you said that the District did full service outside of all engineering. Didn't McKinley have an engineer working with him? A. Yes.

Q. Mr. Powers? A. Yes.

Q. Then when McKinley got through his grading Mr. Powers was employed by Mr. Bohnett?

A. Yes, I think that is right.

Q. So there was a slight amount of services done on the outside by somebody else besides the District?

A. My understanding of these men was they were checking the quantities so as to be sure to get the proper payments.

Q. They were checking the District surveyors?

A. Yes.

Q. The other day when you testified you said that the normally accepted method of driving a tunnel as you understood it was keeping the concrete from 200 to 300 feet back of the face, the excavated face of the tunnel. Do you remember that testimony?

A. I don't remember stating it exactly in that way.

Q. It is on page 866 of the transcript.

The Court: Q. Do you recall that statement?

A. I would not say that that statement is entirely correct, your Honor. The normal accepted way of driving a tunnel is to complete the tunnel before any concreting is done in the tunnel.

(Testimony of Thomas Moore Price.)

Mr. Tinning: Q. Mr. Price, when you made that statement did you do so with the knowledge of the fact that the Richmond Tunnel, Pt. Richmond Tunnel, on the San Francisco Bay shore, some 1,400 feet long, and larger in cross section than this was entirely drifted through, ringed out around the perimeter and the lining placed before the core was removed? A. I didn't know that. [1418]

Q. Do you know of any tunnel over the size of some particular drift in this tunnel that was entirely excavated before it was lined with permanent concrete?

A. The Boulder diversion tunnel was that way.

Q. That is not exactly in this vicinity.

A. I did not understand you were talking of this vicinity.

Q. I am talking about the Coast Range Mountains and the vicinity of San Francisco Bay.

A. I don't know of; I don't know of any tunnel as large as this except the Yerba Buena.

Q. Was the Yerba Buena built that way?

A. The Yerba Buena core was left in place.

Q. It was not excavated before it was lined?

A. No. That is the only tunnel that compares with this in size.

Q. Why did you call it the normal way? Were you referring as a basis for your answer to the Boulder Dam tunnel?

A. By "normal way" was referring to the nor-

(Testimony of Thomas Moore Price.)

mal way of concreting, namely, using movable steel forms.

Q. When you spoke about the normal accepted method of excavating and concreting you were referring only to lining with cement with steel forms?

A. Yes, that is what I mean.

Q. You had 800 or 900 feet of tunnel open in each bore of the Broadway Tunnel before you started your normal concrete operation, did you not?

A. Well, it is a matter of record, but I could check it up again, but I will say somewhere around there. It might have been a little more than one or a little less than the other.

Q. We will average it up. You knew in May 1935 that the timbers were moving?

A. The latter part of May.

Q. Had anyone told you during the preceding months from December to May that it was likely that the timbers would start moving if you did not get the concrte in?

A. I do not recall any advice to that effect.

Q. What about your guiding star?

A. He never did. [1419]

Q. He never told you? A. No.

Q. You knew, didn't you, when you were in charge of this work, that in the Sacramento Northern Tunnel, approximately a mile or a mile and a half away, that there had been a great deal of difficulty in holding the timbers?

(Testimony of Thomas Moore Price.)

A. No, I did not know it at that time.

Q. You didn't know about that? A. No.

Q. You have learned since that is true, haven't you?

A. No, I can't say that I did, except I understood from one of the men who was on the job they had some difficulty near one portal, and the rest, my understanding is to the effect that the tunnel was timbered and left open, and that the Sacramento Northern annually made an effort to put in a little concrete, and eventually I believe they got it concreted all the way through, but I am not sure of that fact.

Q. Have you ever been through the tunnel?

A. Only on the train.

Q. The same way you inspected the one at Oleum?

A. No, I inspected the one at Oleum from the rear end. I did not this other.

The Court: The train was not going very fast at that point?

A. I might say the Oleum tunnel is a larger tunnel.

Mr. Tinning: Q. Much larger in size than the Sacramento Northern? A. Yes.

Q. Your knowledge you gained from the inspection you expected to use in the Broadway Tunnel?

A. No, I do not claim that.

Q. After you discovered that the timbers were

(Testimony of Thomas Moore Price.)

moving, Mr. Price, did you continue to measure them?

A. No, we did not do a great deal of measuring until in the August period, as I recall it; we watched them carefully, the tunnel superintendent watched them carefully.

The Court: August, 1935?

A. August, 1935. I don't recall measuring them particularly at that time.

Mr. Tinning: Q. In other words, during the months when your [1420] consultants came on?

A. Yes, I believe so.

Q. After that you began to take measurements of the timbers? A. Yes.

Q. And you discovered, did you not, Mr. Price, that this was a progressive movement, increasing rapidly as time elapsed?

A. Yes, in the portion we had last excavated.

Q. And that the only way to control the movement once it had started was to reset timbers?

A. At first, during July, apparently there was no movement in the arch, as far as we did detect or could detect, the movement was in the side wall against a plumb post, and we noticed it by the plumb posts bowing and breaking.

Q. Did you have any jumbo or other apparatus by which you could measure the arch in July?

A. No, but we had a catwalk up there, and it was inspected daily.

Q. In other words, it would have to be visible,

(Testimony of Thomas Moore Price.)

you did not take measurements of particular timbers?

A. No.

Q. You didn't know that there were any particular stresses on the segments of the arch as they went up until in August?

A. Not in general, but in the plumb posts.

Q. These plumb posts that you described yesterday were particularly around this Wildcat fault area that were giving you difficulty?

A. They were in the cherts section, all of it. I never could distinguish any fault through there at all, unless it was all fault.

Q. You never saw any fault?

A. Unless it was all fault, there was not any difference in it.

Q. You went through the Wildcat fault and you didn't notice there was any difference in it?

A. I did not. I hoped to get out of it every day, which we never did.

Q. You said that you had considerable difficulty about getting your concrete started and spent some time on Friday and the day [1421] before discussing that. The matter of ordering forms was a matter for the decision of the contractor, was it not?

A. Yes.

Q. I think you testified it was April 21 when you finally ordered forms, is that correct?

A. April 13.

Q. April 13? A. April 13, 1935. [1422]

(Testimony of Thomas Moore Price.)

Mr. Tinning: Q. You knew in December that you planned to use steel forms, didn't you?

A. We hoped to use them, yes.

Q. On June 7th of 1934, Six Companies sent the District a plan of steel forms, did they not?

A. I am not sure.

Q. And throughout the entire plan of progress, you had expected to use the method of using steel forms in these tunnels? A. Yes.

Q. No steel form was ordered until, you now state, the 13th of April, 1935?

A. None were ordered until that date.

Q. It was approximately 10 months after the contract date? A. Yes.

Q. And you were several hundred feet underground in April, and by the time the steel forms were on the job, it took some time into June before they were ready, you had progressed or driven a couple of hundred feet further into the hill. I am using round numbers. A. Approximately, yes.

Q. You stated something about the time that you had to hold your forms,—the difficulties involved in that. You knew, from your specifications, that the District Engineer could provide that you would have to hold your forms 21 days in places of heavy pressure, and that, in all concrete arches, you might expect to have to hold them 72 hours, which was in the specifications?

A. Yes, I knew that; but I did not think anybody would ever be so crazy as to enforce that time,

(Testimony of Thomas Moore Price.)

on concrete forms. I don't mean "crazy"; I mean "unwise."

Q. You think it was too slow?

A. Entirely too slow.

Q. You knew about these provisions, though in the specifications, didn't you? A. Yes.

Q. And the specifications were the same when you bid,—when Six Companies bid,—as when you came on the job on September 20th?

A. Yes, sir. I wish to say, again, though, that is an unheard of procedure, and I don't think ever was the practice anywhere, nor was the practice at Broadway. The practical time he finally got it at [1423] was 24 hours except in places of pressure.

Q. How long did you hold your wooden forms?

A. Well, it was not a question of holding them. If we had any difficulties, I don't think there is any record of it.

Q. I am talking not about the contractor's convenience or desire to get along with a minimum number of steel forms, which were, of course, expensive pieces of equipment. I am talking now about the integrity of the structure to secure lining of a hardness and strength which permits support of the weight in moving ground. Isn't it a fact that, wherever you built wood forms, as shown on your diagram, Plaintiff's Exhibit 74, those were installed in places where the ground was showing pressure;

(Testimony of Thomas Moore Price.)

at the time the concrete forms were installed there had been moving of the timbers? A. Yes.

Q. And, in all of those places where you placed wooden forms, you were holding 21 days?

A. I do not think so. I don't recall we were holding, any particular time. There was no requirement that I can recall of ever stripping timber off. We could not do much when they moved back.

Q. So the fact they remained there some length of time had nothing to do with the fact that it was necessary to support the concrete arch until, in these moving areas, the concrete had acquired its strength by seasoning for 21 days?

A. I don't think so. I have a memory that we stripped a lot of those forms in 10 days; but I am not positive of it.

Q. In the sections where you did not have wood forms, after you got started and it was determined what the setting strength of your concrete was, by test, you were permitted to remove those forms in what time?

A. Progressively; the first 5 days for some period of time after we started on the east of the portal concrete—I don't mean "5 days." I mean "72 hours"; and then, I believe, 48 hours and, [1424] finally, 24 hours.

Q. That is the way you worked through the majority of the tunnel, then, is it not? A. Yes.

(Testimony of Thomas Moore Price.)

Q. Have you ever seen the collapsible steel form which can be collapsed in sections and carried forward through to the new fresh work underneath the remainder of the steel form?

A. Yes, I have.

Q. That is a common practice, is it not, in using steel forms in tunnels?

A. I think it is, particularly in smaller tunnels.

Q. You consider the Sunset Tunnel, here in San Francisco, a very much smaller tunnel than this?

A. Yes, I think considerably smaller.

Q. You think the problems that they had there are not comparable to the problems here?

A. No; I don't think so. I don't think they are comparable in size and in shape, particularly in shape.

Q. The Sunset Tunnel had a top or cross-section of 29 feet, which is 35—29 cubic yards per lineal foot; and this was 35,—the neat design?

A. 36, isn't it?

Q. Not very much difference, was there?

A. About 33 per cent—35 per cent.

Q. Between 29 and—25 per cent smaller. The Sunset Tunnel was a big tunnel?

A. I will take it the other way, to get a bigger figure; that much bigger than the Sunset Tunnel.

Q. I see. Mr. Price, it is true, is it not, in the Sunset Tunnel, that the contractor provided 120 lineal feet of steel forms that were in sections and folded down and moved up ahead into the fresh

(Testimony of Thomas Moore Price.)

work underneath the forms which were holding the concrete up until it seasoned?

A. I understood he did move them underneath, but I don't recall that anyone ever told me about how many feet he had.

Q. As a tunnel engineer of experience, you would not say he did not [1425] have 120 feet?

A. No; I wouldn't know.

Q. How many lineal feet of form did you have in this tunnel?

A. We had 36 in each tunnel.

Q. That would be 72? A. 72 feet.

Q. You had 6000 feet of tunnel in contemplation when you started? A. Yes.

Q. You stated, the other day, Mr. Price, that you referred the question of the steel forms to Mr. Boggs on February 9th, and you had no reply until March. Isn't it a fact that, during all of January, February, March, April, May, June, there was a man named Counzelman working for Six Companies who was in direct charge of the design of the steel forms? A. Yes.

Q. Isn't it a fact that he was in almost daily communication with the District Engineer, throughout this period? A. Yes.

Q. And he was reporting to you what the suggestions were that were being made by the District Engineer?

A. Yes, he was working with them, trying to get the answer.

(Testimony of Thomas Moore Price.)

Q. And, from day to day, he received answers on these matters, and he was told that the chutes that he provided in the manifold forms that were shown on your plan of February 9th would be likely to plug and block in the same way you had found trouble when you used the Hackley gun?

A. I am not clear on what you mean.

Q. You will remember your February 9th plan had some chute or tube that ran down. You have a poster here, gentlemen, that shows that.

The Court: We will take a recess while you are looking it up.

(Recess) [1426]

(After Recess)

Mr. Tinning: Q. Mr. Price, we were discussing the steel forms shown by the plan which accompanied your letter?

The Court: I am familiar with this.

Mr. Tinning: Q. —your letter of February 9, 1935; and I asked you if it was not a fact that Mr. Counzelman was advised by the District people that they thought he would have difficulty with the manifolds that are shown on this plan leading into the concrete forms.

A. I don't recall that; but I do recall that they suggested that we would have trouble in preventing segregation as the material discharged from the chute.

(Testimony of Thomas Moore Price.)

Mr. Smith: What exhibit number is that, Mr. Tinning?

Mr. Tinning: Exhibit 62.

The Witness: The principal problem we were worried with was the discharging from the pipe into the forms at various points.

Mr. Tinning: Q. Well, you did not have to wait until March to get that information from the people who were consulted by Mr. Counzelman; you stated you did not get any reply to your letter of February 9th of 1935 until some time in March?

A. We never did get a written reply from them.

Q. Did you get any information from the District as to whether or not it was a plan which they thought would be satisfactory?

A. I don't recall anything particularly, with the exception of Mr. Bogg's position on pouring concrete.

Q. What was that?

A. While he would not stop us, if we wished to pour the lining integral with the furring concrete, nevertheless he did not feel it would be a good plan to do so.

Q. He did not believe it would be satisfactory, because he thought it might endanger some of the members that had to be poured into—

A. Yes; the ventilating flues.

Q. Looking at Exhibit 74, the furring concrete that is referred to [1427] is this material I am

(Testimony of Thomas Moore Price.)

pointing to, in the interior of the arch, or it is no part of the structural arch that holds up the mass, the ground?

A. It is the lighter shade of concrete against the side wall in the cross-sections.

Q. You were desirous, when you presented that plan of trying to work out a method, of pouring all of the material that is shown below the ventilating slab at one pour? A. Yes.

Q. In about every few feet was a metal duct, shown by the dotted lines, leading from the ventilation slab down to a point about 4 or 5 feet above the floor of the tunnel?

A. I believe they were on 12 foot centers.

Q. 12 foot centers. Those were—They are wider at the top and come down narrow at this point, and then, with a nozzle at the bottom that carries the fresh air from the fresh air duct down through the concrete and into the tunnel at a point 4 or 5 feet above the base? A. Yes.

Q. Those were about 12 feet apart; and there was about 2 inches of concrete over their face, was there not?

A. Approximately; I do not recall.

Q. A thin section? A. A thin section.

The Court: In the chamber?

Mr. Tinning: This duct, your Honor, is a steel chamber that leads down between— It is a pipe that leads down,— a flattened pipe that leads down

(Testimony of Thomas Moore Price.)

from the air duct, at the top of the tunnel, and carries the air through the concrete. It is a conduit.

The Court: Oh, I understand.

Mr. Tinning: And those were 10 feet apart; and lightly constructed of metal; and there was a section between each, where the concrete would have had considerable additional space where there were no ducts, so there was a complication there, in trying to get the concrete in and out, was there not?

A. No. I did not [1428] think there was any complication, getting the concrete in and out. I thought it would be easier to get it in through the opening at the top. The principal difficulty was due to the thickness of the metal in the ventilating flues, —the hydrostatic pressure might damage it.

Q. Yes. So you would not get the air circulation for which the tunnel was designed?

A. Yes.

Q. On the other side of the tunnel, there were electric conduits, called for in the plans and specifications, that carried wiring—

A. Yes; soapstone conduits.

Q. Which would also present difficulty with respect to displacement and so on? A. Yes.

Q. Upon concrete being poured in?

A. Yes.

Q. That method was, from your talk with Mr. Boggs — he said he would not forbid you to do it; but you finally decided to abandon that method?

A. Yes.

(Testimony of Thomas Moore Price.)

Q. And go on to another one?

A. He got me scared on it.

Q. He did not mislead you in that respect?

A. Not that I recall. [1429]

Q. In your plan of April 2, 1935, Defendant's Exhibit II, you prepared another method of handling this concrete after you got it out of the pipe, and that was the so-called "elephant trunk"?

A. No, you are confused in the drawing; that is in the side elevation shown as a chute following the form down to the port into the form, so that the concrete would be shot into the form at various elevations.

Q. Was the form built that way?

A. Yes, it was built that way, and changed on the job.

Q. After you got it on the job you adopted a method of putting your concrete in near the top of the arch and letting it down with an elephant trunk inside? A. Yes.

Q. It is a fact, is it not, that you had a meeting with respect to the design of the steel forms at Mr. Boggs' office on February 2, 1935?

A. I do not recall, Mr. Tinning, possibly so.

Q. Do you remember being present at a meeting later of Mr. Counzelman, yourself, Mr. Boggs, Mr. Barkley, Boggs' assistant, and Davis, of the District Engineer's Office, Mr. Brown, and C. H. Sweetser, of the Bureau of Public Roads, in which you outlined the proposed method of placing concrete? A. As I say, I don't recall.

(Testimony of Thomas Moore Price.)

Q. You don't recall that? A. No, I do not.

Q. And don't you recall that following that meeting Mr. Boggs wrote you a letter of February 5, asking you to present your sketches, which you sent him on February 9th?

A. I know he wrote a letter. I do not recall the meeting. I do not deny that, but just at the moment I do not remember it.

Q. You do not recall that? A. No.

Q. When you sent him that schedule on February 12, 1935, you showed the proposed plan of concreting operations on the first of May?

A. Yes.

Q. You did not have your steel forms ordered until the 13th of April, [1430] and they were not delivered on the job until sometime in June?

A. That is right.

Q. Isn't it true that following your conversation with Mr. Boggs on February 2nd, and all of these other gentlemen present, that Mr. Counzelman was in consultation with Mr. Collins, one of the District Engineers, and in charge of the concreting for the district on many days during the period from February 9 to February 12, 1935, up to and including the time that actual concreting operations started?

A. Yes, I believe that is so.

Q. And with respect to all of these details that you proposed you had suggestions from the District Engineer, I am referring to Mr. Collins, and his discussions with Mr. Counzelman with respect to

(Testimony of Thomas Moore Price.)

all of the details which were taken up from time to time with the District Engineer?

A. I could not answer that yes, because Mr. Counzelman reported to me in these conversations the general answer was that he did approach the District Engineer's representative to get an approval on something, and there was no suggestion as to improvements on it, or anything else; the only answer that we could get was that would not be acceptable or that would be acceptable. For instance, taking a little matter about the ventilation hangers, the steel members that were embedded in the concrete lining to support the ventilation flues, it was difficult to construct them because it required welding in the tunnel, which was against the regulations of the Industrial Accident Commission, and they stuck down in the tunnel as they were designed, and interfered with the movement of the forms. And that was one of the principal things Mr. Counzelman was working on, as well as the ventilation flues. Mr. Boggs worried me about the ventilating flues being distorted and disturbed by any attempt in pouring concrete around them, and I knew that sometime we had to pour concrete around them, [1431] because they had to be embedded in concrete, and they are subject to some hydrostatic pressure, not as much as in the forms, and I conceived the idea of changing the design of the hangers and ventilating flues, and that was one of the principal

(Testimony of Thomas Moore Price.)

things that Mr. Counzelman was working on and endeavoring to get that design changed.

Q. He did not get it changed, did he?

A. Yes, we got both of them changed. We never did make the changed designs of the flues. We went back to the metal flues after we had been able to get the district to change the method. He let the manufacturer fabricate them, and all of these changes of hanger designs completely changed it.

Q. What was the difference in the design of the hangers? The hangers are these metal pieces shown on Plaintiff's Exhibit 54, the members which hold the ventilation slabs? A. Yes.

Q. What was the change in the design?

A. The hangers shown by the plans consisted of a flat bar of steel cast into the concrete projecting downward into the tunnel approximately 9 inches, as I recall, at each one of these places, and the plans of the job provided for welding these additional bars onto these hangers. That at the time was not practicable, because we were prohibited from doing any welding in the tunnel.

Q. How did you work it out?

A. I worked it out by designing a casting which would fit up inside of the concrete that had threads in it, so that these hangers could be rounded off, and screwed up into the concrete and thereby giving us a hanger flush with the concrete.

Q. You knew that the specifications and plans were matters of your own consideration, that those

(Testimony of Thomas Moore Price.)

had to be worked out. That was in the plans and specifications?

A. Yes, that is what we designed. [1432]

The Court: Am I correct that your plan was a more economical method?

A. No, I do not think there was much difference in the cost.

Q. As the welding and the operation that you have described there?

A. Possibly some more. I don't know what the welding would cost, we never did it.

Q. I spent a good many years of my life in the iron work business. You would be surprised about it.

A. I have no way of comparing it directly.

Q. You want to be careful. The useful part of my life, when I thought I was producing something, in my younger days, I was familiar with some of these matters that you are discussing now. Proceed.

Mr. Tinning: Q. There was no substantial difference in the price, I understand?

A. I don't know, Mr. Tinning. I have not the costs on it.

Q. It was done for the convenience of the contractor, in working out the method of using steel forms in the way in which he desired?

A. Yes, and for the purpose of complying with the requirements of the Industrial Accident Commission.

(Testimony of Thomas Moore Price.)

The Court: If that was the only problem on this job we would have no worry.

A. It was difficult to get his approval. I believe we asked for it in January, 1935, and we did not finally get the engineer's approval of it until June.

Mr. Tinning: Q. Of course, you were held up all the time in your work, the concrete plant was ready and the forms were ready, and you were just atremble waiting for that?

A. No, I do not claim that.

Q. It did not make any difference?

A. I do not say it did not make any difference. I do not claim that we were held up by it [1433] to any extent.

Q. Did you ever give any consideration toward subcontracting the placing of concrete in the tunnel?

A. I think we did talk about it once upon a time. I think we approached Mr. Hackley on it.

Q. Isn't it a fact that on January 24, 1935, that you and Mr. Stanley Hand went over to the tunnel and discussed the question of Six Companies subcontracting this work?

A. Not to Mr. Hand.

Q. Whom did you discuss it with besides Mr. Hackley?

A. I do not recall just at the moment. I remember discussing it with him once.

Q. Did you discuss it with Mr. Kettlewells?

A. I don't recall.

Q. You don't recall that? A. No.

(Testimony of Thomas Moore Price.)

Q. But you did discuss it with Mr. Hackley?

A. Yes, I remember discussing it with him.

Q. In what month? A. I do not recall.

Q. Was it not in January and February of 1935?

A. It possibly was, I do not recall.

Q. You were just getting under ground and you were not able to make a satisfactory arrangement to subcontract?

A. As I recall it we did not get far with Mr. Hackley. He was either not interested or, anyway, no concrete result came from it.

Q. Either way? A. Either way.

Q. Either in the tunnel or subcontracting?

A. No.

Q. It is true, is it not, Mr. Price, there were other ways of handling electric power in this tunnel than through a box with a motor in it and compressed air, keeping out any explosive gases that might gain entrance to the box?

A. Yes. The only other way, however, I knew was to have a box strong enough, like a box on the electric power, which is operated by batteries, so if an explosion occurred in the motor, itself, the case would be so strong it could not possibly break it.

[1434]

Q. Isn't it a fact that for a great many years there had been electric motors for use in mines, motors built to special specifications and approved by the United States Bureau of Mines?

A. That was the motor I am speaking of.

(Testimony of Thomas Moore Price.)

Q. Isn't it true that those motors could be obtained from General Electric Company on order?

A. Yes.

Q. Why didn't you get them?

A. I tried to get them. It took them, I think it was, about six months to get them built specially for the job. They had to be built specially for this pumpcrete.

Q. As I understand it, you needed about 50 horsepower motors on each side of the pump, two 50-horsepower motors? A. Yes.

Q. Isn't it a fact that they used alternating current motors in the Hetch Hetchy tunnel?

A. I don't know.

Q. Which was constructed a year or two before the Broadway Tunnel? A. I don't know that.

Q. Did you know anything about the Hetch Hetchy tunnels when you were working on the Broadway tunnel?

A. I knew quite a bit from hearsay. I do not recall that particular point, though. One of the particular troubles outside of the motors was running wires into the tunnel and these explosion proof motors that you are speaking of operated by batteries on the trains that run in and out.

Q. Mr. Price, I am asking you if it is not a fact that on the Hetch Hetchy tunnels alternating current motors constructed by the General Electric Company, approved by the Industrial Accident Commission of the State of California were used in a

(Testimony of Thomas Moore Price.)

tunnel in which they had special safety orders due to gas?

A. I knew they were used on locomotives.

Q. I am not talking about batteries, or direct current motors. I am talking about alternating current motors made by the General Electric Company.

A. I don't know that.

Q. You don't know that? A. No. [1435]

Q. And that these motors, new, from the General Electric Company, could be delivered in three weeks' time? A. I didn't know that.

Q. You don't know what the regulations were by the Industrial Accident Commission, then, with respect to the operation of alternating current motors in the Hetch Hetchy tunnels? A. No, I do not.

Q. Did you make any inquiry when you were trying to solve this problem?

A. I do not recall making any inquiry. I made inquiry with respect to air motors from the Hetch Hetchy supply, the warehouse, at Livermore.

Q. For the things that they had been using over there? A. Yes.

Q. How big was the air motor you had on your steam shovel?

A. I don't know, it was a revamped steam engine.

Q. How many horsepower did it deliver?

A. I don't know.

Q. Approximately?

(Testimony of Thomas Moore Price.)

A. I would say approximately, I would just approximate it as 20 or 25 horsepower, I may be wrong.

Q. How big was the steam shovel? What was the yardage capacity of the bucket?

A. A yard, I think.

Q. One yard? A. Yes.

Q. Wasn't it a yard and a half?

A. We had a bucket on there at the beginning which I believe was 1½ yards, and which we found was too large, and I believe we changed back to the old size of the standard design for the shovel.

Q. It is your testimony now that you think that the horsepower of the air motor that operated the steam shovel was 25 horsepower?

A. Only a guess, I would estimate that.

Q. You are testifying?

A. I am telling you, I don't know.

Q. You don't know? A. No, I don't know.

Q. How many steam shovels did you have in the tunnel, power shovels?

A. We had two steam shovels operated by air, one in each tunnel.

Q. Did they both have the same kind of revamped engine from the Hetch [1436] Hetchy?

A. No, they did not come from the Hetch Hetchy, at all.

Q. Where did they come from?

A. I don't know exactly where they came from.

Q. Were they new equipment?

(Testimony of Thomas Moore Price.)

A. No, they were not. They were revamped equipment with the boom shortened and dipper stick shortened to fit the tunnel. They were secured before I came on the job. I forget who they got them from.

Q. Did they have the same sized air motor on them? A. Yes, I think so.

Q. What was that revamped from?

A. An air engine and a steam engine are identical. There was no change made.

Q. What did you mean by being revamped?

A. I was speaking of the boom and dipper stick.

Q. I thought you said the air motors were revamped. A. No, I did not mean to say that.

Q. They were steam shovels, and instead of putting steam into them you put air into them?

A. Yes.

Q. You think they were 25-horsepower motors?

A. Yes.

Q. Isn't it a fact that air motors could be purchased in the general trade, 50 horsepower air motors, that were subsequently used on the Pumperete?

A. No.

Q. It was not possible?

A. I tried to adapt them to it; the pumperete had to be moved from one tunnel into the other, had to be portable.

Q. You didn't know a way of doing it, that you could buy 50 horsepower air motors if you desired it?

(Testimony of Thomas Moore Price.)

A. I presume you could buy a steam engine which would serve the purpose. They were a very clumsy arrangement.

Q. And it would even have been possible, Mr. Price, if it was deemed necessary for you to work it out, to have put in a steam plant at [1437] the mouth of the tunnel and run a pipe line in and operated these plants with steam?

A. I would be inclined to answer no.

Q. You don't think it would?

A. I don't think it would because of the distance in the tunnel.

Q. Now, with respect to your concrete plant, you said that when you came on the job it was practically finished.

A. That portion of the plant with respect to the unloading of the material at the railroad and the mixing plant at the west portal, I presume that, I think that the whole concrete arrangement could be called a plant, a concrete plant. I do not think any individual item of it would be a concrete plant.

Q. You had the unloading bins at the railroad, you had the concrete mixing plant where you mixed your concrete near the west portal; that plant was not finished when you started in to concrete these rings at the west portal in October, was it?

A. No.

Q. It could easily have been finished if you had cared to do so in advance of that time, because it was practically finished when you came down on September 20th?

(Testimony of Thomas Moore Price.)

A. Yes, but I do not admit it could be easily finished.

Q. How long would it take, in your opinion, to finish the concrete plant, including these various units, after September 20th? You said it was practically finished, when you came on the job.

A. Well, if the Landvale track were not in there, it would have taken at least six weeks to get that portion of it ready. The plant, itself, was ready, but the servicing arrangement of the plant was not finished, at the upper portals,—I am not quite clear on the state in which the mixers were. I am inclined to think one of the mixers—none of the machinery for batching the concrete had been put in. I would say it would take at least six weeks to do that work.

Q. As a matter of fact, the mixers did not come on the job until [1438] sometime in November? They came up from the Boulder Dam?

A. Possibly so, I can't recall.

Q. About Thanksgiving Day they were there?

A. I don't recall.

Q. You remember that fact?

A. I don't remember, but it is entirely possible.

Q. Then the plant just stood there from that time until along about June of 1935, didn't it?

A. In the meantime we had completed it.

Q. What did you do to it from the time you came there in September until, say, the 1st of June, 1935?

(Testimony of Thomas Moore Price.)

A. Well, we completed the plant and tuned it up, got it so that it would run, got all the batching apparatus in, built a pipe line from the highway to the plant; when we tried it out we did not have enough water; we perfected a method of hauling cement from the unloading plant and made all of the thousand and one changes on the plant in order to get it to function properly.

Q. As a matter of fact, wasn't that done, all of that work done after June 20, 1935? A. No.

Q. Just before you started concreting?

A. No, I do not think so.

Q. You do not think so? A. No.

Q. Isn't it a fact that the first aggregate that you hauled from your Landvale connection to the concrete bunkers to make your first trial run was June 26, 1935?

A. I would say approximately about that date.

Q. So you could not test it until you had something in it to work on?

A. I did not mean we did test it.

Q. Isn't it a fact that the concrete engineer, Mr. Davis, checked the scales or had the scales checked and sealed on the 27th of June, 1935?

A. I don't recall.

Q. Isn't it a fact that the concrete plant was not ready for operation until the 1st of July, 1935?

A. I think that is approximately [1439] correct.

Q. What is that?

A. I think that is approximately correct.

(Testimony of Thomas Moore Price.)

Q. Over a year after you had started work on the project? A. Yes.

Q. After you started to run the plant it took you a couple of weeks to get it smoothed down, didn't it?

A. After we started to run the plant—you are referring to the plant, itself?

Q. The aggregates plant, up where you had your cement in one bunker and your sand in another bunker and your aggregate and your rock in another?

A. I don't recall that, it would be an expectable result.

Q. Mr. Price, you had, on the chute that led from your gravel bin down to your concrete mixer, you had to put vibrators on so that the material would run through them?

A. As I recall it we had some trouble with the chutes and I put on belt conveyors.

Q. But when you started on July 2, 1935, you had to put form vibrators in there so that the stuff would run down and mix?

A. That is the general practice in cement.

Q. How about the sand?

A. It might have been at that particular time—I don't recall. I know we usually use vibrators on chutes that carry cement.

Q. After you put your belt conveyor in you continued to use vibrators, didn't you?

(Testimony of Thomas Moore Price.)

A. I don't think there was any chute left after we put the conveyors in.

Q. You got rid of the chutes? A. Yes.

Q. And put in belt conveyors? A. Yes.

Q. And that was completed on July 17th?

A. I don't recall.

Q. So it was about the middle of July, 1935, something over fifteen months after commencing the work on the concrete plant before you had your concrete aggregates plant operating to put concrete into the tunnel? A. Yes, approximately.

Q. How long did it take after you started to set up the Boulder Dam [1440] concrete plant?

A. I think about 21 months.

Q. 21 months? A. Yes.

Q. How long do you think was a reasonable time to get your concrete plant ready on the Broadway tunnel?

A. The concrete plant could have been gotten ready shortly after the first of the year 1935.

Q. You think it would take six months to get the plant in shape as a reasonable time?

A. I don't understand your question.

Q. You say shortly after the 1st of January. The contract started in June. That would be about six months, would it not?

The Court: He wants to know if it would take that long to get the concrete plant ready.

A. Yes, I would say it would take six months.

Mr. Tinning: Q. Now, with reference to the Pumpcrete, I understood you to say it was not a

(Testimony of Thomas Moore Price.)

thoroughly tested equipment at the time it came on the job, and that you did not know very much about it, so you made an investigation.

A. I do not understand your question.

Q. Read it.

(Question read by the reporter.)

A. I do not agree with the last part of the statement.

Q. Which part, about the investigation?

A. That I did not know a great deal about it.

Q. You did know a good deal about it, didn't you? A. I knew something about it.

Q. I believe you said that you knew that it had been used for two years at Boulder Dam in the tunnel.

A. No, I said it had been used off and on on the remote sections of the work of Boulder Dam for approximately two years. My best recollection is it had been used in some of the small inclined shafts right from the power house. [1441]

Q. Is it your testimony now that it was not used in lining arches of the main Boulder Dam tunnel?

A. It was not. A Hackley gun was used.

Q. What was the size of the aggregates that you used in your Pumperete at Boulder Dam?

A. Up to the latter part of 1934 1½ inches.

Q. By the time that you were making your investigation of the Pumperete did you know that the Pumperete had been successfully using aggregates of 2½-inch size?

(Testimony of Thomas Moore Price.)

A. In the latter part of 1934, in December, yes.

Q. That was the size that you had used on the tunnel? A. On the Broadway Tunnel.

Q. Mr. Price, I show you a Pumpcrete circular issued by the Chain Belt Company, of Milwaukee, Wis., U. S. A., "Concrete by Pipeline," Copyrighted in 1934, and ask you if the picture of the Boulder Dam tunnels is a fair representation of those tunnels as you saw them?

A. Yes, but that is a picture of the raise from the diverting tunnel to the intake, to the spillway. I think that was done in the latter part of 1934.

Q. Is the Pumcrete shown in this photograph?

A. Yes.

Q. What size aggregates at that time were worked?

A. Approximately 3-inch, pass a 3-inch screen.

Q. Considerably larger than what was required at the Broadway tunnel?

A. The Broadway tunnel required aggregate passing a 3-inch screen.

Q. I will ask you to look at page 2 of this catalog and the photographic reproduction appearing at the left of the page entitled "Forms and pipe set at downstream end of 37-foot tunnel being fed by dual Pumpcrete above."

A. Yes, that is the upper penstock tunnel.

Q. Is that a small tunnel?

A. Yes, it was approximately 40 feet, as I recall,

(Testimony of Thomas Moore Price.)

outside diameter, compared with the 60-foot for the diversion tunnel. [1442]

The Court: Let me see that.

Mr. Tinning: Q. So that the tunnel that you have called a small tunnel at Boulder Dam, 37 feet, was just about the same size as our tunnel, was it not?

Mr. Marrin: I wonder if we might have that marked for identification?

Mr. Tinning: I was going to introduce it.

The Court: It may be admitted. That is what you want.

(The catalog is marked "Defendant's Exhibit F-4.")

Mr. Tinning: Q. The tunnel that I have just been discussing with you, Mr. Price, is a tunnel 37 feet in diameter? A. Yes.

Q. You call that a small penstock tunnel?

A. No.

Q. What tunnel do you call it?

A. The upper penstock tunnel.

Q. You call it 37 feet, don't you? A. Yes.

The Court: This one?

Mr. Tinning: Yes.

Q. I am asking you if this tunnel that you just referred to of 37 feet was not about the same size as our tunnel, the Broadway Tunnel?

A. Yes, approximately.

(Testimony of Thomas Moore Price.)

Q. You used Pumpcrete in 1934 at Boulder Dam on a 37-foot tunnel and that was successful?

A. In the latter part, very late in 1934.

Q. You were a member of the Six Companies, and that information was available to you?

A. Yes, and that is how I know about it, because it was only in the latter part of 1934 that the Pumpcrete—that the Chain Belt Company had been able to perfect their valve arrangement so that it could handle 2½-inch aggregates, and that is why I was considering it for the Broadway Tunnel. The pump up to that time had not been successful on the 2½-inch aggregates. The tunnel I was speaking of was a tunnel that we used Pumpcrete on that would handle 1½-inch aggregates, up to that time, up to the very late [1443] part of 1934.

Q. Right here on San Francisco Bay one of Mr. Kaiser's companies was using the Pumpcrete pumping concrete and 2½-inch aggregates into the foundations of the San Francisco Bay Bridge in the fall of 1934, was it not?

A. No, it was not Mr. Kaiser's company. And how I knew about the operations, I spent many nights on it. I was out there approximately 30 or 40.

Q. That was an independent contractor?

A. That was an independent contractor. It was being built by the Chain Belt Company, and my personal friend, C. F. Ball, was out here with the Pumpcrete from the Chain Belt Company, and it was not a success.

(Testimony of Thomas Moore Price.)

Q. It was not a success?

A. It was not a success.

Q. But that is the way it was built?

A. That is the way it was built after wasting a lot of concrete trying to get the thing running, because it would stop up about every twenty minutes.

Q. That was in 1934?

A. In the early part of 1934, as I recall.

Q. I was directing attention to the use of the pumpcrete on the Bay Bridge in the latter part of 1934. Were you on the bridge span with your friend from the Chain Belt Company until you got this plant working well? A. Yes.

The Court: We will take an adjournment now until tomorrow morning at ten o'clock.

(An adjournment was here taken until tomorrow, Wednesday, May 4, 1938, at ten o'clock a.m.)

[1444]

Wednesday, May 4, 1938
10:00 o'Clock A. M.

THOMAS MOORE PRICE

Cross Examination (continued)

Mr. Tinning: Q. Mr. Price, yesterday, when we were engaged in this examination, I understood you to say that you thought a reasonable time to complete construction of the concrete plant, which

(Testimony of Thomas Moore Price.)

includes the different units that you referred to. would be about six months; and I notice the record, on page 1033, says "16 months." I understood your answer correctly, did I not?

A. No; I thought you were referring to the mixing plant.

The Court: In any event, his testimony was six months?

Mr. Tinning: Yes.

The Court: The record is in error. Wasn't that true?

Mr. Tinning: May it be stipulated that Mr. Price's reply to the Court's question on page 1033 of the transcript should have stated "six months" instead of "sixteen months," as the record shows?

Mr. Marrin: Yes; that is what Mr. Price stated.

The Court: If there is any question about it, you can clear it up on examination by either side.

Mr. Tinning: Q. There is not any question about it, is there, Mr. Price, that is what you said?

A. That is what I said, but I was referring particularly to the plant outside the tunnel, — the mixing plant.

Q. That is what I was referring to.

A. Yes.

Q. All the Landvale plant and whatever went into the mixing plant? A. Yes.

Q. And six months was a reasonable time, in your opinion, for that construction?

A. I believe so.

(Testimony of Thomas Moore Price.)

Q. Defendant's Exhibit "N," the schedule of August 9, 1934, shows that it was planned to complete all of this plant by August 31, 1934. [1445] Was Mr. Fontaine's judgment in that respect erroneous, in your opinion?

A. Well, I imagine the facts speak for themselves. I don't know exactly what his judgment was. It was not completed by that time.

Mr. Tinning: May we have Defendant's Exhibit "N," please, Mr. Clerk?

Q. "Company Work Tunnel Proper Plant and Equipment Installation,"—that line shows it was to be completed on August 31, 1934, does it not?

A. Yes.

Q. Do you consider, in your opinion, that Mr. Fontaine was wrong in contemplating the construction of that plant in six weeks, as the exhibit shows?

A. I am unable to say.

Q. Could it have been constructed in six weeks?

A. In six months?

Q. Six weeks.

A. Well, I don't know what extent that particular item went to; but I don't believe all the plant, as finally installed—that there may be installed in six weeks— For instance, it is very difficult, at the beginning of a job, to know the extent of what it will consist of. For instance, a lot of the plant on the Broadway job was not completed for a considerable time after 1935; and, as I recall, things are improved and changed all the time as the job progresses.

(Testimony of Thomas Moore Price.)

Q. The point I am referring to is what your progress schedule,—Six Companies' progress schedule,—that was filed with the District on August 9, 1934 showed, with respect to the "Company Work Tunnel Proper," the first item is "Preparatory Study." Those were to be concluded by the 31st of July. "Plant and Equipment Installation" was to be started somewhere around the 12th of July, and to be completed on August 31, 1934?

A. That is correct, as the diagram says; but the only point I make is: I don't know to what extent that item consists.

Q. Well, Mr. Price, if you just look at the subjects shown under [1446] that heading of "Company Work Tunnel Proper," it includes the construction of the tunnel, does it not?

A. Apparently so.

Q. Mr. Price, you testified here on April 28th, on direct examination, according to the record—and I am now reading from page 846—

A. I am sorry; I did not understand that question due to the confusion in the room.

Q. I can read from here, and that will make it a little easier for you. You understood what I was asking?

A. No; I did not. Someone coughed and I missed the question.

Q. On April 28th, you testified, in response to Mr. Marrin's question, as follows—and I am reading, gentlemen from page 846:

(Testimony of Thomas Moore Price.)

"Q. What was your position with Six Companies of California?

"A. I was called project manager.

"Q. What were the duties of that position?

"A. The duties of the position were to handle the business end of the job.

"Q. How long did you remain in that position?

"A. Why, I am still in it, so far as I know. I stayed with the job until we rescinded the job in June, 1936. Since that date, I was occupied for the first year in looking after Six Companies of California equipment and tools and other interests on the job, and since that time I have been largely engaged in making preparation for this litigation."

Q. Is that what you testified at that time?

A. Yes, to the best of my recollection.

Q. As a matter of fact, Mr. Price, isn't it true that you last worked and went off the payroll of Six Companies of California on the 31st day of December, 1935?

A. No, sir; I have never been off since I started.

Q. By "this job," I am referring to the Broadway Tunnel job. I don't know what you may have done for Six Companies somewhere else.

A. No. [1447]

Q. Isn't it a fact the certified transcripts of payrolls filed by Six Companies of California with the

(Testimony of Thomas Moore Price.)

Joint Highway District show that you were carried on the payroll as project manager to December 31, 1935, and that thereafter you do not again appear on any payroll that was filed with the District at that time or at any time?

A. I am unable to say.

Q. You don't know?

A. I don't know exactly—

Q. As project manager, didn't you have to certify these payrolls that were filed?

A. No; I don't recall that I did.

Q. Who did?

A. I think, the auditor,—Mr. Sloane.

Q. Why were you left off after December 31, 1935?

A. I cannot tell you. I still got my pay.

Q. Or was it charged to something other than Joint Highway District No. 13,—that Broadway Tunnel job?

A. I don't know that it was. I am unable to tell you, at the moment.

Q. Well, we will come back to that. Mr. Price, do you recollect the conversation on or about the 20th of June, 1935 that occurred near the east portal of the tunnel, in which Mr. S. D. Bechtel and yourself were present representing Six Companies, and Resident Engineer Gelston and District Engineer Boggs were also present?

A. No; I do not recall it.

(Testimony of Thomas Moore Price.)

Q. What is it that you do not recall,—the incident of a conversation or the date?

A. I don't recall—I have been trying to refresh my mind since I heard you ask Mr. Bechtel about that meeting, but I just simply don't recall it.

Q. Well, it is a fact, is it not, that at a conference at which you were present in June of 1935, after you knew there was some intrusion of timber,—the timbers were moving,—you were present when Mr. Bechtel asked Mr. Boggs for permission to permit the timbers to intrude into the neat concrete section?

A. Yes; I know [1448] Mr. Bechtel asked Mr. Boggs that, on several occasions; but I am unable to place any definite conference.

Q. Well, it was prior to your starting the concreting, was it not?

A. Possibly so; I don't recall.

Q. Well, Mr. Price, at the time these conversations with respect to permitting the timbers to intrude into the specified section of the concrete lining, you had not started concreting, had you?

A. I am unable to tell you, Mr. Tinning. We started concreting on July 19th, as I recall—on or about that date; that is the arch lining.

Q. You knew, some time in May the timbers were moving into the required section?

A. Yes, the latter part of May, 1935.

Q. So that you would not say that such a conversation in which Mr. Bechtel requested permis-

(Testimony of Thomas Moore Price.)

sion to permit the timbers to intrude into the neat concrete section did not occur in June of 1935 and the persons I have stated were present?

A. I am unable to state the time.

Q. You have no memory on it?

A. I explained that I have no memory of the exact time. I remember Mr. Bechtel speaking of it to Mr. Boggs.

Q. When you installed the concrete in the west portal rings, you knew, after the forms were stripped, that the concrete that was placed there was not satisfactory?

A. Well, it was not satisfactory, to the extent that there were cold joints, apparently, in the concrete; and I think cold joints are not good concrete.

Q. You also had voids, did you not, places where the concrete was not of uniform texture; there had been segregation?

A. Yes; but I did not regard that so seriously, because that is quite a common condition in most tunnels,—voids in the concrete; and it is easily repaired. It is not a serious condition, in my opinion.

Q. Well, it costs considerable time and money to have to put in [1449] pneumatic guns, and drill and chip out that type of bad concrete, does it not?

A. It depends upon the extent of it.

The Court: We will take a short recess.

(Recess) [1450]

(Testimony of Thomas Moore Price.)

(After recess):

Mr. Tinning: Q. Mr. Price, you stated that there were some cold joints in the Hackley concrete. I would like to show you two photographs taken in the down-grade tunnel which show what I believe to be cold joints. Will you look at the one which you are holding on top, which is a view of crown area down-grade tunnel April 8, 1936, Station 111+90, and I will ask you if that is a fair representation of the cold joints that you refer to?

A. Yes, I think that is a fair representation—no. I think that is a construction joint, Mr. Tinning. The cold joint that I had reference to that I particularly noticed with Mr. Boggs and Professor Davis was down near the floor of the tunnel rather than the arch. I believe that is the down-grade tunnel, isn't it?

Q. Yes.

A. I think that is a construction joint. I would not be positive, but apparently it is.

Q. The down-grade tunnel was poured when you had two Hackley guns?

A. We poured from the rear end of the tunnel to the front end in raises.

Q. Or lifts? A. Yes.

Q. Did you pour that with a Hackley gun throughout? A. Yes.

Q. So that the concrete that is shown on the bottom of the picture below this point is a Hackley gun concrete?

(Testimony of Thomas Moore Price.)

A. This is all Hackley gun concrete.

Q. And the top is also Hackley? A. Yes.

Q. And the top is the arch, is it not?

A. It appears to be so from the photograph.

Q. In the part of the tunnel which was poured by the drawing out of the pipe that led the concrete from the Hackley gun into the forms and as you drew out the pipe the concrete was discharged toward the interior of the tunnel, attempting to concrete the top of the [1451] arch by that method?

A. Yes, apparently so. I think it should be explained for the record that this picture represents the concrete after it had been dug out with pneumatic equipment and not as it was left.

Q. I am coming to that. The area above the line that you say is a construction joint and which appears to be broken or rough concrete shows the reinforcing steel and shows the marks of tools, does it not? A. Apparently it does.

Q. That was concrete that was cut out in 1936 because it was defective, it was soft or porous?

A. I did not see the concrete at the time it was cut out. I understand that the Bureau of Public Roads raised some objection to it, and that they desired it to be repaired. I did not see it. I did not notice it when it was taken out, that it was very bad. I did not see any rock pockets. I did not see it after it had been cut out. I saw it after it had been repaired with gunnite.

(Testimony of Thomas Moore Price.)

Q. You know it was cut out and repaired by Six Companies?

A. That is my understanding, a portion of it, approximately 8 yards, or an infinitesimal part of it.

Q. Infinitesimal?

A. A small percentage.

Q. If the arch was weak at that point the tunnel might fall down, it didn't have to be 8 square yards to be defective?

A. Cubic yards.

Q. Or square yards. You were in heavy ground at this portal, were you not, you had pressures there so that it required stulling against the core when you poured the concrete? A. Yes.

Q. It was a place where the integrity of the arch was required, if at any place in the tunnel it was required? A. Yes.

Q. That was the reason the concrete was repaired, to give you a full arch there?

A. That is my understanding.

Mr. Tinning: We offer these two photographs in evidence [1452] of the down-grade tunnel station 111+90 as Defendant's Exhibit in proper order.

The Court: They may be admitted and marked.

Mr. Tinning: We will ask that they be marked 1 and 2, but be all one exhibit.

[Set forth in the Book of Exhibits at page 464.]

(The photographs were marked Defendant's Exhibit G-4.)

(Testimony of Thomas Moore Price.)

Q. Mr. Price, I show you a photograph marked "View of left crown up-grade tunnel, station 112+05, May 30, 1936," and ask you if that appears to be a picture of the roof or crown, in other words looking up at the arch of the tunnel?

A. Yes, it appears to be.

Q. From your knowledge of the stations of the tunnel would you say that that was in the ring that was poured with the Hackley gun in the up-grade tunnel?

A. Yet, it apparently is; as you say, it was Station 112+05, and that was poured at the time.

Q. Doesn't the photograph show two marks in the same manner that the preceding photograph shown you indicates that the concrete had been chipped out? A. Yes.

Q. And that was done to take care of what condition?

A. In the same manner as in the south tunnel, the engineer ordered that this concrete be chipped and repaired with fresh concrete.

Q. That was concrete placed by the Hackley gun under the difficulties and method that both Mr. Larson and you have described? A. Yes.

Mr. Tinning: We offer this photograph in evidence as Defendant's Exhibit in proper order.

The Court: It may be admitted and marked.

(Testimony of Thomas Moore Price.)

(The photograph was marked "Defendant's Exhibit H-4.")

[Set forth in the Book of Exhibits at page 466.]

Mr. Tinning: Q. You have already testified that the original method planned for concreting this tunnel was the Hackley gun, and you demonstrated to your own satisfaction, in attempting to get the concrete into the first ring, that first 100 feet of the west [1453] portal that the method was not satisfactory for use in these tunnels?

A. Yes, under the interpretation of the specifications by the engineer.

Q. I believe you also said it was general practice to shoot concrete into the top of the form and let it fall down over the sides of the form toward the bottom. Do you remember that testimony, Mr. Price?

A. Yes. I think I qualified that by in my experience it was general practice as far as I knew.

Q. In your experience? A. Yes.

Q. You never had poured concrete in a tunnel before, had you, Mr. Price?

A. I had seen concrete poured in the tunnels at Boulder Dam.

Q. Would you mind answering the question, had you ever poured concrete in any tunnel before, yourself? A. No, I had not.

Q. And in Boulder Dam is the place that you had seen concrete poured in a tunnel?

(Testimony of Thomas Moore Price.)

A. Yes, and also in the Metropolitan Aqueduct in Southern California.

Q. The Metropolitan was a small tunnel?

A. Yes.

Q. 15 feet?

A. Variable, but I think it was somewhat larger.

Q. About the size of the Claremont Tunnel or a little bit larger?

A. I was never in the Claremont Tunnel, but I believe it was approximately the same.

Q. It was an aqueduct, a water project?

A. Yes.

Q. Isn't it true, Mr. Price, that by dropping the concrete over the sides of the forms, unless you have an apparatus to continue your discharge so that you rapidly fill the form, when you get your coat of concrete on the inside the upper part of the form will build up like plaster or concrete, and that you do not get a smooth form when you come up and build up the point where this concrete has stuck onto the form as it dropped back?

A. I would say that would [1454] depend on the time element.

Q. That is what I am asking you about. You have a concrete gun and you are pouring a lift into the form and you can only put in enough concrete to pour six feet of lift and then have to stop for half an hour or an hour while you get more concrete ready to put in there, and in the meantime the concrete that was spattered on the

(Testimony of Thomas Moore Price.)

side of the form will drop down and go into place and it will harden, and you have a rough interior to your form, where the concrete is stuck?

A. You should not stop pouring; under the plan I think you should pour on you should not stop for half an hour or an hour, and, furthermore, if the concrete stuck to the form on top, if it was good concrete, I do not see any objection to its sticking there, because the form would shape the concrete on the inside of the form and not the concrete, itself.

Q. You would have, in effect, a cold joint?

A. Yes, if it stopped too long you would have.

Q. Isn't that about what you did in these pictures that required you to chip that stuff out?

A. From the cut of these, I am rather inclined to think they were rock pockets than cold joints.

Q. By a rock pocket you mean a place where the material had segregated?

A. Yes, where there was not enough mixture in the concrete to complete the fill.

Q. It is a fact that you had to shut down in your operations in placing concrete in the Broadway Tunnel far in excess of half an hour?

A. Oh, yes, it was a very unsatisfactory operation.

Q. You had to get in your forms and clean them off where the concrete had stuck and hard-

(Testimony of Thomas Moore Price.)

ened while you were getting more concrete to put into the forms?

A. Well, we had to get in there and clean off the forms on the inspector's orders, regardless of whether we were waiting for concrete or any other reason. [1455]

Q. But you had to get in there, if there was concrete sticking in the forms, you had to get in and clean them off? A. Oh, yes.

Q. You also had to clean off the reinforcing steel? A. Yes.

Q. That was due to the fact that the concrete was shot in there under very high pressure, was it not?

A. Yes, but I think it is the normal pressure for that type of placing.

Q. You had a wooden baffle box, did you not, a kind of a long box in there that concrete went in and distributed through gates into various parts of the form? A. Yes, we tried that.

Q. It did not work very well?

A. Not very well.

Q. It blew to pieces from the force of the concrete that was shot in there?

A. Yes, it would blow to pieces and stop up with the rock and block the pipe line. It was almost impossible to divert that concrete any way except from a straight line.

Q. Did you know that in the pouring of the

(Testimony of Thomas Moore Price.)

Sunset Tunnel in San Francisco that a Hackley gun was used? A. Yes.

Q. And used satisfactorily?

A. It is my understanding that it was.

Q. Now, in that tunnel when you were trying to solve this problem at the west portal with your Hackley gun, did you know that they had poured the Sunset Tunnel by gravity about four feet in height on each side of the tunnel?

A. I don't know the height, but I understood that they had.

Q. And then moved in a collapsible steel form, in which there was 120 feet used, and that in this steel form, when it was placed in the proper location in that tunnel a steel baffle box was placed into which the discharge pipe from the Hackley gun discharged the concrete? Did you know that?

A. I found it out shortly after that.

Q. You did not use a steel baffle box in the Broadway Tunnel? [1456].

A. Yes, we started with it.

Q. Did you use the steel baffle box while you were trying to pour these two rings at the west portal?

A. Yes, particularly in the south tunnel, the first tunnel we poured.

Q. What do you mean? You just told us a few moments ago you used a wooden baffle box.

A. We tried wood and steel. both.

(Testimony of Thomas Moore Price.)

Q. What was your steel baffle box, the dimensions, the size? A. I don't recall.

Q. You don't recall? A. No, not exactly.

Q. You were in charge of the work. How long was the steel baffle box.

A. I don't recall. I would estimate around 3 or 4 feet.

Q. That would be a kind of a nozzle, would it?

A. No, I would not so regard it. I understand a baffle box to be a box to absorb the force of the flow of the concrete as much as possible from the end of the pipe.

Q. How long was your wooden baffle box?

A. I do not recall.

Q. Was it 6 feet, or 10 feet, or 15 feet, or 20 feet, or how long was it? A. I do not recall.

Q. You have no recollection?

A. No, I don't remember the wooden box particularly, at all. I was thinking of the steel box. We might have tried a wooden box lined with steel, I do not recall.

Q. How long was the steel baffle box that was used in the Sunset Tunnel?

A. I don't know exactly.

Q. What do you estimate it was?

A. I would estimate it as 3, or 4 or 5 feet.

Q. 3 or 4 feet.

A. Somewhere in there. I never saw it. I am just trying to give you my understanding.

Q. Your understanding from the information you have?

(Testimony of Thomas Moore Price.)

A. That I gathered from various sources since that time, shortly after the pouring.

Q. You did not control this work, yourself, did you? A. In the [1457] tunnel?

Q. The concreting that you have mentioned?

A. No, I did not.

Q. Mr. Larson was doing that?

A. Yes, I conferred with him daily about it, trying to help to get the thing along.

Q. But you had had no experience in that specific kind af an operation? A. No, I had not.

Q. This baffle box that was used in the Sunset Tunnel was used throughout the tunnel in placing the Hackley concrete, was it not?

A. That is my understanding.

Q. Wherein did the baffle box that you tried to use in the Broadway Tunnel differ from the baffle box that was used in the Sunset Tunnel?

A. I don't think it was a question of baffle box. As a matter of fact, to my understanding there were several reasons why the concrete in the Sunset Tunnel could be successfully poured, where it could not be successfully poured by that method in the Broadway Tunnel. Now, those reasons particularly are as follows: In the first place, the aggregate in the Sunset Tunnel was 1¼-inch aggregate, a very small aggregate, gravel; the aggregate in the Broadway Tunnel was almost 3-inch aggregate, particularly 2½ inches in size, that is the maximum

(Testimony of Thomas Moore Price.)

size through a 3-inch screen; it makes a tremendous difference in handling aggregate from a pneumatic gun with 3-inch aggregates and with 1¼-inch aggregates; you can control it much better. In the second place, according to the plans which were made on the job, the concrete in the Sunset Tunnel was permitted to fall approximately 18 feet in the open, and in the Broadway Tunnel we could not let it fall over 6 feet, which meant that concrete had to be led from the top of the baffle box down almost to the bottom; in the third place, they permitted the use of flowing sand in the concrete, 40 per cent, of the sand was a very fine flowing sand picked up at the banks near Golden Gate Park, where these [1458] sand dunes are, and which makes the concrete very plastic. In the concrete section on the Broadway Tunnel we had to use a very small grained sand, which made very good concrete if it could be handled, but nevertheless it was not plastic like the concrete on this Sunset Tunnel. For those reasons it made a totally different job handling it with the Hackley gun.

Q. You knew all about that, you have told us, at the time you were doing the work?

A. No, I found out later.

Q. In other words, it is your explanation now that due to the different qualities in the concrete on the Sunset Tunnel that the problem was different from that on the Broadway Tunnel?

A. I think it was totally different.

(Testimony of Thomas Moore Price.)

Q. And you also considered another element was different, and that is on the Sunset Tunnel the contractor was permitted to drop the concrete a distance of 18 feet? A. Yes.

Q. Isn't it a fact that in the Sunset Tunnel there was a long baffle box which extended the length of the form, whatever form they were pouring, that it had chutes in it, open chutes 6 feet in length, extending out from the baffle box, and that there were gates in the baffle box which were closed to permit the concrete to run in one of these chutes, so that it would be carried over the top of the arch by the chute and not spatter against the top of the arch and causing this flow of raised material to drop down whatever distance was necessary up to 18 feet, or whatever it might have been?

A. I do not recall the exact dimensions of the baffle box. I think probably I have a drawing somewhere if I could locate it and get it as a matter of record.

Q. Your study of the Sunset Tunnel is something that you have made since you have been in this controversey and you did not have that study in mind when you were attempting the pouring?

A. No, I went [1459] into it first shortly after our ill success with the Broadway job, because I was informed that they had used it satisfactorily over there, and I refreshed my mind in the last three months on it again.

(Testimony of Thomas Moore Price.)

Q. Now, do you know that the specifications for the Figueroa Tunnel in Los Angeles provided for horizontal layers of concrete, nearly horizontal layers of concrete?

A. No, I have never seen those specifications.

Q. When you were doing the pouring on this tunnel, after you came there on September 20, you did not have in mind the experience and methods that were used in the Figueroa Tunnel?

A. I did not, because I did not know about it. The concrete placing system was largely planned when I arrived on the job in September, 1934.

Q. But you were going to change the concrete placing system when you arrived on the job; you had a Hackley gun system and then you were going to change when you found it did not work, and I am now directing your attention to other places where the Hackley gun had been used on tunnels of comparative size, and I am asking if you knew about the Figueroa Tunnel.

A. No, I didn't know the conditions down there, the requirements or the conditions.

Q. You didn't know in that tunnel the sides were poured from a gravity car and that the top was poured by pneumatic gun method?

A. No, I didn't know anything about the job.

Q. Or that in that tunnel all the lining was placed before the core was taken out?

A. I did not know that.

(Testimony of Thomas Moore Price.)

Q. And later on the walls of the tunnel on the north end of the Golden Gate Bridge were built?

A. Yes.

Q. The core was left in and lining put in and then the core taken out? A. Yes.

Q. Did you know of the Sepulveda Tunnel that was built in 1929 and 1930, where the Hackley gun was used and horizontal layers of con- [1460] crete were laid with lifts coming up in the forms and that a removable pipe with sections was used for placing concrete in that manner in the forms?

A. I don't know of the tunnel. I know to the best of my knowledge a Hackley gun, or some form of pneumatic gun was practically the only system that was available up to the latter part of 1934.

Q. And it worked in those tunnels?

A. I presume it did.

Q. They were built that way. Now, in this tunnel while you were working out a method of placing your concrete you had gone in a distance of approximately 1000 feet in each tunnel before you started concreting?

A. I think it was about 800 feet.

Q. Something like that. And you shut that work down on August 21, 1935, due to the fact that you had a large amount of timber that had to be taken up and taken care of before you could continue the driving of the tunnel?

A. Yes, I think that is correct.

(Testimony of Thomas Moore Price.)

Q. If you had placed your concrete in that tunnel prior to removing the timbers you would not have had to shut down on August 21, would you?

A. I do not think so.

Q. And any delay that resulted from that shutdown or from the repairing of timbers was due to the fact that you had not concreted the tunnel as the excavation progressed?

A. Yes, of course you understand with extenuating circumstances in connection with it; if you could not concrete you could not concrete.

Q. They had concreted the other tunnels?

A. If the ground lining was strong enough to hold it, if it had been, I presume it would not have come in.

Q. It has not fallen down since the concrete lining was put in?

A. I do not think so, I have not checked.

Q. You think you would have heard about it if the Western Construction Company——

A. Yes, I would have heard if there had been any alarming movement. [1461]

Q. You stated that, under the concrete specifications, there was some confusion in your mind as to the method you could use in concreting this tunnel; is that correct?

A. No; I don't remember the word "confusing." I gave my interpretation of what I thought the Contractor could do under the specifications — under my interpretation of the specifications.

(Testimony of Thomas Moore Price.)

Q. Your interpretation of the specifications was — you had a longitudinal view of the tunnel, and you showed the concrete lining, the running down at about a 45 degree line?

A. Yes; that was a sketch of whatever slope the concrete was run on.

Q. Well, it was a demonstration that you thought it could be placed in lines like that? A. Yes.

Q. That would have permitted you to shoot into a solid mass of concrete, or permitted the Hackley gun to discharge against the end of the form and build up, and then you would gradually pull the discharge pipe back, always keeping the end of the discharge pipe in concrete?

A. Your men could stand back of that safely and be vibrating the concrete, which would place it on a slope or slide.

Q. So you could get sloping concrete, sliding concrete or sliding contact lines in that concrete, at whatever slope —

A. Well, that depends on the speed. I don't think you could get contact lines if you poured it continuously and fast enough.

Q. You did not have a plant when you poured these rings on the mouth to permit you to do that?

A. No. The District Inspector, — Mr. P. K. Davis, — told me they would not permit that.

Q. Prior to your pouring? A. Yes.

Q. Did you make any written protest in regard to that? A. No.

(Testimony of Thomas Moore Price.)

Q. Did you read the rest of the specifications after Mr. Davis told you you could not pour that?

A. I read them prior to that.

Q. What is a lift of concrete?

A. I would say a lift of concrete [1462] in my opinion, is a raise in which — It is while you are working; a work interval.

Q. Yes. Where you cease working to put in another form or for some other reason, you make a joint? A. For some reason.

Q. In building a dam, a lift is what you build in one set of forms, isn't it?

A. Yes, I think it could possibly be interpreted that way.

Q. So, when you were interpreting the matter that you read on page 25 of the specifications the other day, as being a section that permitted you to put in layers of concrete and then measured vertically, you did not construe a lift in the manner in which you have just construed it?

A. Yes, I think it is practically the same thing. It is a work interval. You pour concrete on one side to the height you want, and then you go to the other side and pour.

Q. Well, Mr. Price, a lift is something where you get a cold joint, as I understand it, and you said you were going to pour continuously in this form—

A. No; I don't think a lift applies necessarily to a cold joint. I think it would apply to work interval.

(Testimony of Thomas Moore Price.)

Q. What does a layer mean?

A. I would say a lift and a layer is practically synonymous.

Q. The same thing. You think, if you were placing the concrete in a dam, a lift, say, of 10 feet, a set of forms, that the layer which you put in at one form would mean the same thing as a lift?

A. No. I am inclined to think it wouldn't be the same thing. I think a layer probably would be the portion of the lift itself.

Q. The portion of a lift?

A. If you used it that way in a dam, that would be my opinion of it.

Q. Wouldn't it be just the same in concrete forms in a tunnel?

A. Yes, it would be the same thing, except my understanding of the specifications was the lift meant a change from one side, and then you go to the other side and make another lift of 6 feet. Those lifts [1463] would naturally have possibly many layers of the concrete running down the side of the form.

Q. So, if you used your method that you described there, those things you show as the concrete went down were layers, were they not?

A. I think my interpretation of it was you could make a 6 foot raise on one side, and that side would be composed of many layers; and the concrete ran down the side of the form.

Q. And if you had one of these inclined lifts of

(Testimony of Thomas Moore Price.)

6 feet, then you would have, — if you had one of these inclined lifts of 6 feet, then you would have — if you had to stop, you would have a cold joint running down at the angle, or whatever angle the concrete was?

A. Depending on the time it took to get back——

Q. That is what I say; if you were delayed?

A. Long, yes.

Q. You were delayed a good many times, were you not?

A. Yes; we had a lot of delays on pouring the portal concrete.

Q. Now, if you will look at the specifications, Plaintiff's Exhibit No. 3 — look at page 25, Mr. Price. I will call to your attention, first, the section that we read the other day — page 25, the lefthand column:

> "Concrete for the tunnel lining shall be placed continuously between any two adjacent construction joints, in lifts not more than 6 feet deep, measured in a vertical direction. The topmost lift, having a width not to exceed 8 feet, shall not be placed until the adjoining concrete on both sides has been in place for at least seven days, unless otherwise directed by the District Engineer."

You knew of that in the specifications when you started to pour this concrete, didn't you?

A. Yes; we had asked the Engineer about this.

Q. You had been told that you could not pour,

(Testimony of Thomas Moore Price.)

in the inclined lifts or inclined planes that you indicated on your diagram? A. Yes.

Q. You made no protest?

A. Made no protest. [1464]

Q. As I understand it, you stated the other day that you thought that was the controlling matter in placing concrete?

A. No; I did not. I did not intend to make such a statement — such a positive statement as that.

Q. When you were making your plans for this concreting, did you have in mind the provision of Paragraph 12, the provision of Section 15, appearing on page 25, which is headed, "Conveying, Placing and Compacting Concrete"? Did you have those provisions of the specifications in mind?

A. Why, I had them in mind, because we were discussing it almost constantly both with the inspectors and among ourselves.

Q. Now, you will start there with the first sentence which says:

"Concrete, when mixed, shall be immediately conveyed to the forms and deposited without separation of its ingredients."

That meant you could not drop it 18 feet.

A. It does not say anything about 18 feet.

Q. But if you dropped concrete 18 feet, you would likely get separation, wouldn't you?

A. I think you probably would.

Q. "The use of open chutes to convey and deposit concrete will not be permitted, except

(Testimony of Thomas Moore Price.)

for distances of less than 20 feet, and then only by special permission of the District Engineer. When open chutes are used, they must be of such cross section and laid at such inclination that they will permit the flow of concrete of the consistencies herein specified, without the use of additional water to promote free flow."

Now, coming back to the first sentence about the ingredients —

"Only methods of transporting and placing which will deliver concrete of specified consistency without separation of its ingredients will be permitted."

You knew about that, too, didn't you?

A. I knew that was in the specifications.

Q. And that was something that was put in there to give you concrete [1465] on the job and that would prevent rock holes and other things that weaken the concrete if these provisions were not in there? A. Yes, I think so.

Q. Now, we refer to the next portion of this paragraph 12 that appears here:

"Concrete shall not be permitted to fall from a height greater than 6 feet except through an enclosing pipe, in which case the height of fall shall not exceed 12 feet. An enclosing pipe may be required by the District

(Testimony of Thomas Moore Price.)

Engineer for placing concrete in column, walls and deep footings."

The first sentence gave you a right to drop concrete 6 feet, which is, I think, reasonable, isn't it? It will not be likely to segregate in a fall of that distant? A. Yes.

Q. And it also permits the dropping through an enclosed pipe up to 12 feet, — a distance of 12 feet; and that was designed to prevent segregation, was it not?

A. I assume so. I don't think it would hurt to drop it further than that in an enclosed pipe.

Q. But the District Engineer's judgment was different? A. Apparently so.

Q. That was what was bid on; that was the way you bid on the work, wasn't it? A. Yes.

Q. That was the reason for the design of the pipes that accompanied your steel form designs that were presented to the District? A. Yes.

Q. That was the reason you were submitting those, — to be sure they would be acceptable?

A. I was trying to do everything I could to comply with his wishes.

Q. And with the specifications?

A. Well, more particularly with his wishes.

Q. You were able to interpret the specifications?

A. Apparently, I had not been able to up to that time. I interpreted the [1466] specifications on tunnel lining concrete in the way I described the other

(Testimony of Thomas Moore Price.)

day, and the only place it says anything about concrete for tunnel lining — You are reading the specifications that apply to concrete structures outside of the tunnels.

Q. You say it was your interpretation of these specifications that that was a matter appearing in the left-hand column on page 25 about placing tunnel concrete?

A. Well, it particularly describes the tunnel lining.

Q. You say there is nothing in the other column that deals with it?

A. It does not refer to tunnel lining at all. It says "concrete."

Q. Well, we will proceed to consider the next paragraph; in paragraph 12, on the right-hand column of Section 15:

> "Concrete shall be uniformly distributed during the progress of depositing and in no case after deposition shall any portion be displaced in the forms more than 3 feet in a horizontal direction. Care must be taken not to displace the reinforcement, pipes, anchor bolts or other devices which are to be embedded in the concrete."

Mr. Price, as you worked this out in your steel form, you had some kind of an elephant trunk that you swung back and forth so you were able to comply with this paragraph?

(Testimony of Thomas Moore Price.)

A. Yes, we had an elephant trunk that we could swing back and forth.

Q. The next paragraph:

"Concrete shall be deposited in uniform horizontal layers, not deeper than 12 inches, care being taken to avoid inclined planes or inclined construction joints."

Now, those inclined planes that you show in your diagram would not comply with this provision of the specifications, would they?

A. No; it would not, unless the concrete were poured so fast the inclined plane would be obliterated in the pouring.

Q. And possibility of human error needs to be considered in pouring a permanent structure?

A. Yes. [1467]

Q. "Construction joints must be built with square ends and level tops, except as otherwise directed by the District Engineer; in arch type structures, joints shall be made at right angles to the axis of the rib. Each layer shall either be placed before the previous layer shall have taken its initital set, or, if the previous layer has taken its initial set, the surface of the previous layer shall be prepared as herein specified for the preparation of hardened surfaces."

(Testimony of Thomas Moore Price.)

What did you understand by the previous sentence, where it said: "Arch type structures"? Didn't you consider that that referred to tunnel concrete?

A. No. We had several arch type structures outside the tunnel.

Q. What is the diameter of the tunnel structure?

A. It is an arch.

Q. Did you overlook that when you were looking at the specifications, — that the tunnel was an arch?

A. I don't remember seeing it particularly, but I have explained why I felt the other concrete applied to this particular set of specifications.

Q. Would you say, now, you were in error in considering —

A. The engineer told me I was, before I even tried.

Q. Let's look at the headings which appear in Paragraph 10, which appears at the bottom of page 24. It says:

"Placing Concrete." Placing concrete refers to placing concrete everywhere on this project, does it not? A. I think so.

Q. The only place in the specifications where, in detail, the methods that will be permitted are specified? A. I think so.

Q. In the tunnels and outside the tunnels. Below "Placing Concrete," it says, "Time and Rate of Placing." Then, under Paragraph 11, you have, "Preparation of Forms and Surfaces." Then, on

(Testimony of Thomas Moore Price.)

Paragraph 12, on the right-hand column, page 25, you have, "Conveying, Placing and Compacting Concrete." That applied to all the concreting, whether it [1468] was in a culvert, an outside structure, a building or the tunnel; those are the only places in the specifications where you find concrete specifications — isn't that so?

A. That was the Engineer's interpretation of it.

Q. Do you find it anywhere else?

A. No, except under the "Tunnels," which refers back to it.

Q. We have already been over that, and you so testified? A. Yes.

Q. You said you were to look for your tunnel concreting in Section 13 and Section 15?

A. Well, 13 refers to it.

Q. Look on page 61, please, Mr. Price, and you will be able to follow this — page 61, the left-hand column, a portion of Section 32, Paragraph 6:

"Description. — The concrete lining for the tunnels shall consist of the concrete arch ring as shown on the plans, with steel reinforcing as designated or as otherwise directed by the District Engineer.

"The thicknesses of concrete shown are minimum thicknesses, and the attention of the Contractor is directed to provisions hereinbefore set forth in this section, requiring additional concrete as made necessary by the methods of

(Testimony of Thomas Moore Price.)

excavating, timbering. or otherwise supporting the excavation.

"7. Materials. — Concrete for lining shall be Class 'B' concrete, as provided in Section 13, 'Portland Cement Concrete,' of these specifications, and the provisions thereof and the provisions contained in Section 15, 'Concrete Structures,' shall apply to all concrete in tunnel linings except as modified herein. Grouting shall be performed as elsewhere specified in these specifications."

Now, what we have been considering here this morning in these specifications are all portions of Section 15, which appears on page 22 of the specifications, under the heading, "Concrete Structure"? That is true, is it not?

A. Yes. I have also made [1469] reference to aggregates, which are contained under "13," and refer —

Q. That was what you were guided by in your concreting; you made a reference over here on page 61, Section 32, to the Tunnel Concrete; you found yourself in Section 13, the aggregate, the constituents; you understood those specifications without and difficulty? A. Yes, I think so.

Q. "15" was your Concrete Structures?

A. Yes.

Q. You also looked at that, and you were told that the concrete lining should be built in the tun-

(Testimony of Thomas Moore Price.)

nel in accordance with the provisions of Section 15?

A. Yes.

Q. Then you came over to Paragraph 10, subparagraph 10, "Placing Concrete"; and you came to Paragraph 11, and you came to Paragraph 12 of Section 15? A. Yes.

Q. And you got mixed up on your interpretations of this 6 foot lift business?

A. I was so informed by Mr. Davis, the District Inspector.

Q. You thought a lift was the same as a layer?

A. No; I don't say that. I thought a lift referred to an amount of work on one set of the forms.

Q. At any rate, you got straightened out on that with the District Engineer, and you went ahead with the work.

A. I at all times tried to do what he wanted.

Q. Well, you went ahead with the work?

A. To the best of our ability.

Q. You made no written protest about the Engineer's interpretation?

A. No; I don't recall any.

Q. When the Pumperete came on the job in the latter part of June, 1935, you drew to Mr. Boggs's attention the authority that you received from the Industrial Accident Commission, by a letter dated some time in April; he had never seen that letter at that time, had he, Mr. Price?

(Testimony of Thomas Moore Price.)

A. Not to my knowledge. [1470]

Q. You had not advised him of any permission that you had to use electric power in the tunnels at that time? A. I don't recall advising him.

Q. The equipment had come on the job that day, or had just recently come on the job — not the same day; and you talked with Mr. Boggs, and advised him you had an electric motor to operate there?

A. Yes. I would like to explain my last answer: I had been contacting the District through Mr. Counzelman, who had contacted Mr. Collins. I had assumed that he — I say "assumed"; I had been told by Mr. Counzelman that the District Engineer — I don't mean Mr. Boggs — but Mr. Collins had been well aware what we were doing at all times, because I had given orders to Mr. Counzelman to make that clear to Mr. Boggs and the District; so I am unable to definitely state that he was not advised; I don't recall advising him, myself, but, under normal circumstances, I think he would have been advised.

Q. Well, Mr. Price, all I am trying to make clear is that, in so far as a copy of your letter of authority from the Industrial Accident Commission was not communicated to the District, you had not sent a copy of that letter?

A. No, sir; not to my recollection.

Q. What you have in mind about Mr. Counzelman and Mr. Collins — there is no quarrel about

(Testimony of Thomas Moore Price.)

that; they were in almost daily contact about problems?

A. The problem of getting the concrete underway.

Q. And, so far as you know from any conference, you have no knowledge that there was a direct discussion between Counzelman and Collins, or any other inspector of the District, and the Engineer, as to your authority to use the power?

A. No; I don't know as I told Mr. Counzelman to argue, but to thoroughly acquaint the District with every point of that power, and be sure everything was approved before we started anything. We had one sad experience in the portals, and I did not want another; but I was trying my best to make everything go along satisfactorily. [1471]

Q. And when Mr. Boggs saw your equipment on the job, — the two electric motors, with approximately 50 horsepower, as I understood it, — why, he asked you if you had authority to operate that type of equipment with electric power in the tunnels, from the Industrial Accident Commission, under their regulations?

A. Yes. I don't remember him asking me, but apparently, from the letter, he did ask me, and that is why I sent it.

Q. Then you went back to the Industrial Accident Commission and got specific authority?

(Testimony of Thomas Moore Price.)

A. I had already had specific authority, on the slip ring type of motor, but Mr. Boggs had called to my attention we apparently did not have authority on the induction type of motor.

Q. What is the difference between slip ring type of motor and the induction type of motor?

A. A slip ring type of motor is a motor in which the rotating part was electrically charged, by means of brass rings which rotate; whereas an induction motor. the rotating part is not charged.

Q. Is one less likely to spark than the other.

A. Yes.

Q. The induction type is a safer motor, in gas—

A. No; much less safe.

Q. Were the large motors on the Pumpcrete slip ring type?

A. Yes; it was necessary to use a slip ring motor on account of the tremendous starting power required for just a moment or two when the machine started up under a load; also, so it could be stopped at any time with a complete load in the pipeline; so it was necessary to have sufficient power so it could be stopped and again start with a load of concrete moving through the pipe. The slip ring motor, as I understand it, generates a tremendous torque, or starting force for a few moments.

Q. That is for the purpose of starting up with an inert mass of concrete? A. Yes. [1472]

Q. After you get the concrete moving, I think

(Testimony of Thomas Moore Price.)

you said it takes about one-tenth the power it did to start? A. Well, something like that.

Q. That is a general estimate?

A. Yes, a general estimate.

Q. This permit was for the slip ring motor?

A. Yes, I think it was.

Q. What was it, Mr. Price, that you had to get your permission for?

A. The small induction motor.

Q. Even though they were a safer type of motor than the other type? A. Yes.

Q. So you complied with the specifications and secured a specific safety order from the Industrial Accident Commission?

A. Yes. I would like to explain how it is I had received the permission: In a conference with members of the Safety Department of the Industrial Accident Commission in San Francisco, I had taken my mechanics and electricians over there, Mr. Counzelman, the designer and we had a meeting which lasted almost all the afternoon; and, in that meeting, I brought up, or somebody brought up, the point about the induction motor,—that it had been approved; and we particularly noticed the letter that we received from the Commission——

Q. You are referring now to a letter that was written in April. A. Yes; April, 1935.

Q. Now, you put this Plaintiff's Exhibit No. 74 on the easel the other day, and discussed it; and

(Testimony of Thomas Moore Price.)

there is another exhibit, gentlemen, that is the east portal drift. Exhibit 74 does not show the east portal drift; but Plaintiff's Exhibit 61 does shows those drifts. You will recall, as you stated, it was about the 1st of May, 1935, when you started those drifts? A. Yes.

Q. What did you do with the earth that was removed from the portal?

A. We wasted it on the Fish Ranch or Claremont Road on some private property. [1473]

Q. So, you did not haul any of that dirt over the hill? A. No.

Q. The way Mr. Marrin was indicating on the perspective map. You took the dirt and placed it in a ravine a little above the tunnel?

A. Yes; on private property.

Q. How many thousand cubic yards of that did you remove from the portal?

A. I don't know just at the moment. I know there was a lot, because we open cutted quite a portion of the tunnel job. The banks would slide, and we could not get a face, and we kept cutting back with an open cut to get to the point where we would be safe — where it would be safe for the workmen to start on the drifts.

Q. Isn't it a fact you removed about 25,000 yards of earth from the east portal drifts?

A. The drifts themselves?

Q. Yes.

A. I am unable to state. That is, definitely.

(Testimony of Thomas Moore Price.)

Q. In addition to that, you took, out of those rings on the east end, 60, 75 or 80 feet?

A. Yes; that wouldn't amount to much.

Q. It is shown on Exhibit 74 as being a part of that that was removed, is it not?

A. Just a portion of it .

Q. That also went into this ravine?

A. Yes.

Q. So, 25,000 yards would be a reasonably accurate estimate of the quantity of material that was removed from the tunnel at the east end and placed in the ravine?

A. From the center of the tunnel itself?

Q. Well, you had charge of the tunnel; you have had a lot of experience; you had an east portal approach; and you had an east portal building?

A. Yes. What I mean is we open cutted 35 or 40 or 50 feet of the tunnel on the east end before we ever started the drifts. We were unable to get the banks to the point where they were sufficiently safe, so we excavated quite a considerable yardage of material.

Q. Some of that material was taken a half mile down the road and put on the Eastbay Utility District land, was it not, in a ravine [1474] just this side of the Old Fish Ranch, the north side of the road?

A. I don't recall.

Q. At any rate, there was a considerable amount of material and approximately 25,000 yards that

(Testimony of Thomas Moore Price.)

came out of the tunnel itself and was placed at the east portal?

A. I believe so.

Q. Do you remember your examination of the geological report that you have referred to here, in a discussion of the conditions of the east portal as to whether they might be expected to be good or bad?

A. I think he did mention the east portal; but I would have to have it to refer to again.

Q. He also mentioned the west portal?

A. Yes, I know the west portal was definitely mentioned.

Q. It would have been possible, in this tunnel construction that you were doing, to construct drifts at the west portal and drive through ahead of the general excavation, would it not?

A. Yes, I think it would have been possible. I don't think it would have been practical, on account of interference with the other work.

Q. It would have been possible to proceed with the excavation of those drifts from the west end and have been well underground at the same time you were constructing the west portal building, would it not?

A. Yes, I think almost anything is possible.

Q. You did it at the east portal, didn't you; you had a building under construction on the east portal at the time you were doing this drift work?

A. Yes, we did.

(Testimony of Thomas Moore Price.)

Q. You used one drift to get underground, and then crossed over in another drift to open up —

A. Yes; but we had an area which had been open cutted behind the building.

Q. That would have been possible at the west portal, would it not?

A. Sure. It is possible. I did not think it was practical.

Q. You did not think it was practical. It was practical from the east end?

A. Yes, it was practical because we had an open cut — [1475]

Q. Well, isn't it true, Mr. Price, that you could have gone underground at the east portal without open cutting or drifting in from the east end of the east portal building, and gone right underground, and you would have later had to abandon approximately 100 feet of drift? It could have been done?

A. Yes; but I don't think it would have been practical.

Q. Why not?

A. To work on the building at the same time.

Q. Why not? You had the space in the building in which you had to put your foundation — the space for the transition house, and where the tunnel goes — you could go through the building foundation?

A. In the portal building, that goes underneath the tunnel — the struts —

(Testimony of Thomas Moore Price.)

Q. Your construction struts could have been placed underneath the tunnel? A. Yes.

Q. But you did not? A. No.

Q. It is a fact, however, that you went underground with one drift and then crossed over and drove ahead in two drifts? A. Yes.

Q. And it is also a fact, if you desired to do so, you could have started doing that work in 1934?

A. Yes.

Q. And if you had done it in 1934, you would have had your tunnel hole through much sooner; you would have had no difficulty regarding ventilation, and you would have had drafts through your tunnel? A. Yes.

Q. And you would have been able to use non-safety equipment in it, under those conditions?

A. Yes. I think that would have been a very impractical thing to do. The practical thing to do is to drive the tunnel from the west end completely. We only went to the east end when we found out we could not make sufficient progress on the west end to complete in time.

Q. If you had known all the factors that you would encounter in driving the tunnel, you could have — had you known those things in [1476] 1934, you would not have started the east portal drifts at all?

A. Yes. I think, if one knew everything prior to doing it, it would be a foregone conclusion as to what the result would be.

(Testimony of Thomas Moore Price.)

Q. A great many tunnels are driven from both ends, aren't they?

A. Yes. I don't think tunnels are driven from both ends when the grade is very excessive, though.

Q. How about the Claremont Tunnel?

A. I don't know. I think it was.

Q. Didn't you hear Mr. Larson testify that it was 3. x x x? A. No. [1477]

Q. There was enough grade in the tunnel so that a flood went into it?

A. The amount of grade in the Claremont is so slight that you or I could not tell the difference.

Q. Is there a grade in the Sunset Tunnel?

A. I do not recall. I think there was about 3 per cent.

Q. And they hauled the dirt out of the Sunset Tunnel in trucks, the motors of which were operated to hoist the dirt up the grade?

A. I think most of it was done by lowering, as I recall it, most of the excavation.

Q. Naturally, you would not be able to run it out by gravity?

A. The normal thing to do in a tunnel is to work it from the lower end to get the drainage. If your tunnel is too long, it can be done from both ends.

Q. Would you say that the Sunset Tunnel was an abnormally long tunnel?

A. No, I would say it was not. I would say it was a short tunnel.

(Testimony of Thomas Moore Price.)

Q. It was 4500 feet, was it not — 4200 feet. Would you say the Sunset Tunnel was a short tunnel?

A. It was 4200 feet, you say. I do not recall. I understand it was not a very long tunnel.

Q. Why did you say it was short?

A. Because, as tunnels go, it was not a very long tunnel.

Q. This is a short tunnel, and the same methods that were applied at the Sunset Tunnel as normal methods would be normal at the Broadway Tunnel, would they? A. Yes, possibly.

Q. In tne Sunset Tunnel they excavated from both the upper end of the ground and lower end, and then hauled the material, the tunnel muck, out in trucks, with hoists and cables, up the grade?

A. I understand they did some of it that way. I do not know to what extent. I am of the impression that it was not a great deal.

Q. In this tunnel it is a fact that you did drive from the east end, that you waited until 1935 to do it?

A. We drove wall plate drifts [1478] from the east end, and we did it after we found we were behind schedule on the west end.

Q. And it was your selection to drive from the west end until you started these wall plate drifts in the east end. You selected the method, didn't you, yourself?

(Testimony of Thomas Moore Price.)

A. It was our understanding the method that would be required on account of the muck removal, because it was the normal thing to do, and drive up hill.

Q. It was normal in the Sunset Tunnel?

A. I think they drove largely on the Sunset, I don't know how much, but that is my impression.

Q. Isn't it a fact that you don't know much about what happened in the Sunset Tunnel?

A. No, I have forgotten; it would only be my impression, because I have not refreshed by mind.

Q. Do you not know that they drove with full crews from both ends of the Sunset Tunnel?

A. I think they did a portion of it.

Q. Isn't it a fact that they continuously throughout the driving of the tunnel operation drove on each end with a full crew?

A. I do not think so, but I may be wrong.

Q. You don't know, then?

A. I say I don't think so.

Q. Mr. Price, you testified as to cave-ins, one on the 28th of August, 1935, and the second one on the 22nd of February, 1936. Those cave-ins occurred in the timbered portions of the tunnel?

A. Yes.

Q. There never was a cave-in in any portion of the tunnel where the concrete lining was installed?

A. No, there was not.

Q. I ask you if it was not a fact that on De-

(Testimony of Thomas Moore Price.)

cember 31 your name was dropped from the certified copy of the payroll that was furnished to the District by the Six Companies throughout the time it was on the contract, and that after the 31st of December, 1935, your name no longer appeared on the payroll certificate that was furnished to the District by the Six Companies?

A. I understand that to be the case. [1479]

Q. You do understand that to be the case?

A. Since you asked me, yes.

Q. Have you checked your own records on that?

A. No.

Q. We have a certified copy of the payroll.

The Court: What is the fact? Can you stipulate to that at this time?

Mr. Marrin: Surely, we will be glad to stipulate that at the end of 1935 Mr. Price was transferred onto a different payroll, the General Overhead Payroll of the Company, and consequently his salary did not appear in this particular payroll other than in connection with the work, although he was still retained in the employ of the company and his duties were practically the same.

Mr. Wittschen: Previous to that time his name was carried on it every month, and after that time it never did appear on anything that was given to the District?

Mr. Marrin: I am not arguing the case. I am simply giving the fact.

(Testimony of Thomas Moore Price.)

The Court: I am trying to get the important thing. What was the fact?

Mr. Wittschen: Mr. Marrin said that he was charged differently. The only thing we want him to admit is that for all the time from September, 1934, until December, 1935, on each and every payroll his name appeared as project manager, and after that it was left out and never appeared on anything given to us.

The Court: Is that a fact?

Mr. Marrin: That is a fact.

Mr. Tinning: That is all.

Redirect Examination

Mr. Marrin: Q. Mr. Price, if the ground through which the Broadway Tunnels were driven had been self-supporting, in your opin- [1480] ion could the entire tunnel have been excavated from the west end within the contract time? A. Yes.

Q. And there would have been no necessity for any excavation on the east end?

A. There would not, in my opinion.

Q. I meant starting the excavation at all from the east end?

A. You mean tunnel excavation; naturally we had to excavate for the buildings.

Q. The east portal drifts were not started until after you had prospected enough ground to determine that it probably would not be as represented in the geological report? A. Yes.

(Testimony of Thomas Moore Price.)

Q. Now, referring to your testimony that the work was shut down on August 21, 1935, if the ground had been self-supporting would it have made any difference in the continuance of the excavation whether the concrete lining had been placed or not?

A. I don't think it would.

Q. You could have gone right ahead with the concrete lining and the excavation at the same time?

A. That was my plan, to get to good ground so that we would not have to worry about maintaining it.

Q. There would have been no delay at all to the entire job from the fact that the concrete had not been placed at that time in the excavated portion of the tunnel?

A. I don't think there would have been, other than the delay which naturally slowed us up going through the portion of the ground which we had already excavated; in other words, if we go through bad ground until we could get good ground, we would have to delay going through the bad ground, that is what I mean.

Q. If you had been in good ground at the time you stopped, regardless of the character of the ground which you passed through in the past, you could have continued with the excavation?

A. I would have [1481] recommended continuing it.

Q. While you were concreting the portion that was open? A. Yes.

(Testimony of Thomas Moore Price.)

Q. It was because of the fact that the ground appeared to be continuously worse that the excavation was stopped? A. Yes.

Q. You were asked about the specifications on the Sunset Tunnel and you explained some of the differences between those specifications and the specifications for concreting on the Broadway Tunnel. Did the specifications for the Sunset Tunnel require internal vibration of the concrete?

A. No, I do not think they did.

Q. What do you mean by "internal vibration"?

A. I mean vibration with a mechanical machine of some kind that moves very rapidly through a very small place, like any kind of vibrator that jiggles the concrete and shakes it down into a homogeneous condition.

Q. What is the difference between internal vibration and external vibration?

A. Vibration inside the form and outside the form.

Q. On internal vibration the men have to get into the forms with these machines? A. Yes.

Q. And place them in the concrete and turn the air on and vibrate the concrete?

A. There are two types, there are air and electricity.

Q. And that form of vibration was required in the Broadway Tunnel? A. Yes.

Q. It was not required in the Sunset Tunnel, to the best of your knowledge?

(Testimony of Thomas Moore Price.)

A. To the best of my memory it was not.

Q. Would that make any difference in the handling of concrete?

A. I think it would be less dangerous. It is rather dangerous working around a pneumatic gun, because of flying rock.

Q. In other words, if the men had to be in the forms to vibrate the concrete it would be dangerous to shoot concrete when in there?

A. Yes, it would also make some difference—I would say that is [1482] largely the principal difference, because he would have to stop shooting while you vibrated.

Q. Mr. Tinning asked you on cross-examination about Six Companies, Inc., that built Boulder Dam, and the Six Companies of California. Those were separate corporations, were they not? A. Yes.

Q. The stockholders of the two corporations were not the same? A. They were not the same.

Q. In other words, Six Companies, Inc. had some stockholders who were not stockholders in Six Companies of California?

A. That is my understanding.

Q. Mr. Price, what is the general practice of contractors with respect to subcontracting work?

Mr. Wittschen: Objected to as immaterial, irrelevant, and incompetent, and not in any way binding upon the defendant, and calling for the opinion and conclusion of the witness upon a matter that is not the subject of expert testimony, or material in this case.

(Testimony of Thomas Moore Price.)

Mr. Marrin: On cross-examination they have emphasized the fact that there were subcontractors here, and that one subcontractor relied on another subcontractor, and created an erroneous impression. I want to simply bring out it is very general practice in large constructions to subcontract a part of the work, and that the procedure in this case of the general contractor which was pursued, taking the difficult part of the work on the tunnel and subcontracting the outside work, is not unusual in the construction industry.

The Court: In any event any subcontractor or any number of them, they would be answered for by the contractor.

Mr. Marrin: That is true, the contractor is responsible for them.

Mr. Wittschen: We merely brought out in answer to their claim [1483] of delay that they were subcontractors of their own choosing. It is not material what is done on any other job. There is ample authority on that if your Honor cares to hear it. It does not affect a particular job.

The Court: He has indicated the purpose of the offer. There is no confusion in my mind.

Mr. Marrin: If there is no confusion in your Honor's mind I will withdraw the question.

The Court: Very well.

Mr. Marrin: Q. Mr. Price, you were asked a question on cross-examination by Mr. Tinning with reference to the time when this road from this point

(Testimony of Thomas Moore Price.)

here up to the tunnel and from this point was constructed.

Mr. Tinning: For the sake of the record, you are referring to the Landvale connection and the west portion of the highway?

Mr. Marrin: Yes, I am referring to the highway from the west portal of the tunnel to its connection with Broadway and Keith Avenue in Oakland.

The Court: On what?

Mr. Marrin: On Defendant's Exhibit P.

Q. Would the public have been able to use that road, Mr. Price, had it been completed prior to the completion of the tunnel?

Mr. Tinning: Mr. Marrin, simply for the record, I object to the question. There was no intention on our part to in any way suggest that any part of the project could be turned over to the public use until it was completed as a whole. Our questions were with respect to delay.

Mr. Marrin: Will it be stipulated, then, Mr. Tinning, that this road would not have been in use by the public until the tunnel was completed? [1484]

Mr. Tinning: Yes, until the tunnel was completed.

Mr. Marrin: Mr. Price, in your cross-examination, in answer to a question of Mr. Tinning, you said that the only written applications for an extension of time that had been made were those of June 10, 1935 and the one, I believe, that was dated May 8, 1936. I call your attention to Plaintiff's Exhibit

(Testimony of Thomas Moore Price.)

49, which is a letter of August 28, 1935, and which has already been introduced in evidence and read, and draw your attention to the following part of this letter:

"You are further notified that we have and assert a valid claim for an extension of time for the performance of our contract arising from the causes heretofore stated to you in our request for such extension dated June 10th, 1935, and in addition to the extension of time requested therein, we now assert a right to and request such additional extension of time as may be necessary to complete the contract, in the event that we continue to perform same, based upon the following reasons in addition to those heretofore asserted:

"(a) Heavy, treacherous and unforeseen character of the ground making construction more difficult and slower through no fault of the contractor;

"(b) Inadequacy and unsafety of the design in accordance with our letter to you dated August 23, 1935;

"(c) Additional work required to be done not included, intended, or contemplated by the contract, plans and specifications."

That written application for an extension of time was also filed in addition to those which were testified to, was it not?

A. Yes. I did not think of it at the moment.

(Testimony of Thomas Moore Price.)

Q. You did not have that in mind at the time that you were testifying on cross-examination?

A. No.

Q. Now, I would like to call your attention to Defendant's Exhibit [1485] QQQ, which is a letter dated April 20, 1936, addressed to the Board of Directors, Joint Highway District No. 13, State of California, 1448 Webster Street, Oakland, California. Gentlemen:

"This will serve as formal notice that by proceeding with the construction of the Broadway Low Level Tunnels, the undersigned, Six Companies of California, does not waive, in any manner, the rights and claims which it has heretofore asserted and does now assert against your District.

"The undersigned does, on the contrary, reaffirm and reassert all of its claims as heretofore stated to you in writing, including particularly the statement thereof contained in the letter dated August 28th, 1935, from us to you, and will continue to assert each and all of said claims and any others which may have since been made, either in writing or otherwise, until the same are fully satisfied.

"Yours very truly,

SIX COMPANIES OF CALIFORNIA

By (Signed) HARRY J. KAISER,

President."

That was a reiteration of the claim——

(Testimony of Thomas Moore Price.)

Mr. Tinning: I object to the question as being leading.

Mr. Wittschen: And also calling for a conclusion as to what it was. It speaks for itself.

Mr. Marrin: Q. Did you have that letter in mind at the time you made your answer?

A. No.

Q. That was also filed with the District, was it not? A. Yes.

Mr. Wittschen: We introduced it.

Mr. Marrin: Mr. Price's answer was not quite correct and I wanted to clear it up.

Q. On one of the questions on cross-examination you testified that one of the subcontractors had some engineers checking quantities on the outside work. Do you recall that, Mr. Price? A. Yes. [1486]

Q. What do you mean by checking quantities?

A. A contractor is paid by quantities, so many yards of dirt or so many yards of concrete, or so many lineal feet, and this figure is set by the engineer, and the contractor generally measures or estimates the figures in some way so that he can be sure he is receiving his just reward.

Q. In other words, that is a check made immediately after the work is done?

A. Yes, it is different with different contractors; our own policy on jobs is to check it monthly as the engineer does when he gives it.

Q. I simply wanted to clear up what checking of quantities was. The checking of quantities is

(Testimony of Thomas Moore Price.)

simply so that the subcontractor knows that the engineer is allowing the proper quantity?

A. Yes, the subcontractor or any contractor.

The Court: We will be in recess now until two o'clock.

(A recess was here taken until two o'clock p. m.)

[1487]

Afternoon Session

THOMAS MOORE PRICE,

Redirect Examination (Continued)

Mr. Marrin: Q. Mr. Price, you stated, in answer to a question by Mr. Tinning on cross-examination, that you did not know of any other tunnel construction contract where the Hackley gun had been used that was not successful. Do you desire to correct your answer?

A. Yes; I do know of one case.

Q. What case was that?

A. It was the case in connection with the finishing of this tunnel by the succeeding contractor.

Q. Do you know the facts in connection with the attempt to use the Hackley gun in that case?

A. Yes; I was out there and saw the work.

Q. Will you state what they were?

A. They started out to concrete by the Hackley pneumatic gun, and it took them approximately two days to make the first pour, with it; in other words, they did not make much more progress than we had

(Testimony of Thomas Moore Price.)

made at the portal; that was about the first week in February, as I recall it, in 1937. After pouring a couple of more pours, they gave the system up and rented our Pumpcrete equipment to finish the job with that. I did not think of that at the time.

Q. You testified, on your cross-examination, that the tunnel did not cave in at any place where the concrete had been placed. How far back of the face of the excavation did the cavein of February 22, 1936 occur?

A. I would say the center of—approximately 50 feet back of the core face.

Q. How far was the concrete back of the face of the excavation at that time?

A. Approximately 125 or 130 feet.

Q. Under any plan of concrete that you considered, would the concrete have been closer than that to the face?

A. Not with movable [1488] steel forms. With the core removed, you need some place to work; you had to have space to work in excavation and concrete equipment.

Q. This much space was necessary to work on the excavation?

A. Yes, approximately that much space.

Mr. Marrin: That is all.

Mr. Tinning: No questions.

CLARK RANKIN,

called for the plaintiff; sworn.

Direct Examination

Mr. Marrin: Q. Will you give us your address, Mr. Rankin?

A. 729 Prospect Road, San Mateo, California.

Q. Will you state your education and your experience in construction work?

A. Well, I have lived in construction camps almost from the time I can remember; and my first job on construction work was in the summer of 1922 on the O'Shaughnessy Dam of the Hetch Hetchy Water Supply. The following summer I worked for the Southern Pacific Company, on their double tracking work of the road over the Summit, and on that work I became familiar with hard rock tunnels.

Q. There were some tunnels constructed on that work?

A. Yes; they were short tunnels, constructed through hard rock. I worked on both of these jobs, I might add, on the surveying parties, giving lines and grades for the work that was done by the engineering parties. During this time, I was going to either high school or college; and the following summer, I worked for the Central Pacific Railroad, or the Central Pacific part of the Southern Pacific; it was known as the "Central Pacific." They were putting up the money for this particular job,—the construction work of the Natron Cutoff; I believe it is now known as the Cascade Line.

(Testimony of Clark Rankin.)

Q. Where was that located?

A. This particular work was located in Oregon, —the summit of the Cascade Mountains. I first worked as an [1489] estimator for the railroad company on grading work, and later as a tunnel timbering inspector, tunnel concrete inspector and force account man.

Q. There were tunnels in that work?

A. There was a three-quarter of a mile tunnel, and also a deadend "Y" tunnel of about, I should say, 700 feet in length; single track tunnels.

Q. You may proceed.

A. I was attending Stanford University during this time, although, I might add, I delayed returning to college while being employed on these particular tunnels. I was interested in the work, and stayed there until the completion, in November of 1923, returning to college. Then the next summer I went to work for the Southern Pacific, at what is known as the Weed Cutoff. That was bridge work. I worked as timekeeper and estimator on that. The following summer, 1923, I returned to college and—that was the summer of 1924 that I worked on the Weed Cutoff. In 1925, I worked on a section of the Hetch Hetchy Water Supply; I cannot recall just now—it was pipeline work, if I remember right. The summer of 1926 I worked on the Coast Range Division; that was just opening up; it was the Hetch Hetchy Coast Range Division near Livermore; returning to school; and, in the summer of 1927, again

(Testimony of Clark Rankin.)

returned to these tunnels. During that time, I worked there—the work was just getting underway, and I worked, at that time—well, the work was primarily outside survey work, and also building camps and plant layout of the different portals and the shafts of the future tunnels and building construction.

In December, 1927, I returned to the Hetch Hetchy Project on the Coast Range Division at Livermore, and continued there, working either in engineering or supervisory capacities, depending on which was required of me, at the time, until, I believe, about August of 1934. From August, 1934, until December of 1934, I continued working for the City of San Francisco on the Hetch Hetchy Project, on [1490] the pipeline and building construction. December 13, 1934, I was employed by Six Companies of California, at the Broadway Tunnel, as personnel man or personnel manager. My duties, at that time with Six Companies, were to assist in the employment of tunnel men and labor for the project for Six Companies.

Q. How long did you continue in your position as personnel manager of Six Companies of California?

A. I might add, at this time, that I did not graduate in civil engineering from college; I did not finish my course.

The Court: Q. What excuse have you got for that?

(Testimony of Clark Rankin.)

A. I became primarily interested in the construction work and an opportunity I could not overlook.

The Court: That is all right.

Mr. Marrin: Q. In connection with the Hetch Hetchy work, did you work in the tunnels?

A. I did; I worked in the tunnels and in the office, depending on the work required of me. That was a period, as I say, from 1927 to 1934; and I covered practically every phase of the work at different times.

The Court: Q. How old are you?

A. Thirty-two.

Mr. Marrin: Q. What work did you do when you were in the tunnels?

A. Well, it covers a large field.

The Court: In this tunnel?

Mr. Marrin: In the Hetch Hetchy Tunnel.

The Witness: A. In the Hetch Hetchy Tunnel, I had the opportunity, as I stated before, to see practically every phase of the work. I had the designing of timber sets, in charge of Gunite operation, the headings, special structures. I had the outside designing of buildings, camp buildings, plants, setup of equipment, designing of underground equipment, grouting, superintendent of grouting. Well, there was just any number of things. I had a hand in practically every phase of it that went on at different times. [1491]

(Testimony of Clark Rankin.)

Q. How large were the Hetch Hetchy tunnels?

A. The Hetch Hetchy tunnels were circular in shape, 10 foot 6 diameter inside; the excavation varied from 12 to 16 feet.

Q. Why was the excavation so large?

A. To provide ample lining for the different kinds of ground encountered.

Q. Some difficult ground was encountered?

A. Very difficult.

Q. You stated you were employed by Six Companies on December 13, 1934, as personnel manager. What were your duties in connection with that work?

A. Well, under the system of hiring men, the men were sent to us from the different agencies. I acted as representative of Six Companies in connection with an agent of the National Reemployment Service, and, together, we investigated the experience of the men and passed upon that.

Q. How long did you continue in that position?

A. I continued in that position until about May 30, 1935.

Q. What change was made then?

A. Mr. Whitmire, superintendent of both the north and south tunnels, was injured. I believe it was on the morning of May 30th—It was thereabouts; and I was appointed superintendent,—temporary superintendent,—in his absence.

Q. Of the driving operations?

A. Of the driving operations.

(Testimony of Clark Rankin.)

Q. Were you superintendent of the driving operations from that time until the excavation operations were closed down on August 21, 1935?

A. I was in charge of the driving operations until August 21st, under more or less the direction of Mr. Whitmire.

The Court: Q. August, 1936?

A. August 21, 1935.

Mr. Marrin: For illustrative purposes, I would like to offer in evidence this poster, to be marked plaintiff's exhibit next in number.

(The poster was marked "Plaintiff's Exhibit No. 75.") [1492]

Mr. Marrin: Q. Mr. Rankin, will you describe the method of driving which you followed while you were in charge of the tunnel operations; and, in stating that, you can refer to Exhibit 75?

The Court: This is not his method, is it?

The Witness: This method was adopted by Mr. Whitmire.

The Court: Q. Before you went on the job?

A. Before I went on the job and that was where he left off. At the time I went on the job, this method had been employed in the south tunnel for some distance; this is the dragline scraper bottom drift method; Mr. Whitmire designed it and perfected it. At the time I went on the job—Immediately before I went on the job, I think, from April 30th until May 30th, Mr. Whitmire had been in charge also of the north tunnel; and he had not, at

(Testimony of Clark Rankin.)

that time, introduced this system to the north tunnel. He was using the wall plate system in the north tunnel, with these scrapers operating in the wall plate drifts to remove the muck.

Mr. Marrin: Q. Mr. Rankin, a Bagley scraper has been mentioned in the evidence here two or three times. Is a Bagley scraper represented on this drawing?

A. Yes. That is drawn to a scale. This is a Bagley scraper here, the whole back line there; and there is a block in the heading in the drift. This is the load line here, which extended to a hoist mounted on a Jumbo, as illustrated on a poster that was presented before. These two lower drifts were driving ahead. This is a section through the tunnel, and this is a cross-section cut through on the bottom line; that would come down like this. This line represents the core of this area in here, as I said before. Other drifts were pushed through there.

Mr. Tinning: Q. Mr. Rankin, so we can have more or less of a clear record here, which we will be able to follow, you refer to "these drifts,"—the two drifts at floor grade?

A. Yes, the bottom drifts. [1493]

Q. On either side of the tunnel?

A. On either side of the tunnel.

Mr. Marrin: And the witness is referring to the diagram on the left side of the poster.

A. This drift was driven ahead, and the muck that was broken down in the face of this bottom

(Testimony of Clark Rankin.)

drift was removed by the Bagley scraper running back and forth in here. Behind the bottom drift and above it was driven a second drift on each side. The muck from that drift was dropped into the lower drift and was also removed by the Bagley scraper. At the toe of the core was the air-operated shovel. Following behind the second drift, the operation was carried in one large drift or ring drift; this whole area here was opened up and dropped down on either side, and that muck was also taken out with the Bagley scraper.

Q. This longitudinal section, this part to which I am pointing, represents the lower drift to which I am pointing on the diagram on the right-hand side of the poster? A. Yes.

Q. The part in here, which is the second drift on the longitudinal section, represents the second drift on the poster? A. Yes.

Q. And the part here, which is the upper part on the longitudinal section, represents the ring part on the poster? A. That is right.

Q. And the muck was—These piles here represent muck which was dropped down onto these boards which were the floor of the second drift?

A. That is right.

Q. And these were then dragged out to the core; the wavy line represents the core? A. Yes.

Q. And dropped down through the face?

A. Yes.

Q. Was that method of excavation followed all the time you were in charge of the driving?

(Testimony of Clark Rankin.)

A. All the time, in both the north and south tunnels. [1494]

Q. What distance in each of the tunnels was excavated under your supervision from May 30, 1935 to August 21, 1935?

A. As I recall, the total excavation from May 30 to August 21 in the north tunnel was approximately 450 feet; in the south tunnel the distance was 550 or 560 feet. Those are approximate figures.

Q. What was the character of the gorund that was encountered in this excavation when you were in charge?

A. During the time I was in charge the ground was of a very mottled character, you might say, it was not in true formation. It consisted of what I called junk. There were kidneys of sandstone, I think the geologist called them a diabase dyke, and various formations in between. Some cherts, so called cherts.

Q. Was it self-supporting? A. Not at all.

Q. All required heavy timbering?

A. All required heavy timbering, as shown in the poster.

Q. What were the reasons for closing down the excavation on August 21, 1935?

A. Well, on August 21, 1935, particularly in the north tunnel, we were going into very bad ground, showing weight, and immediately behind the core, and in the headings of the drifts, we were pushing ahead, we had a cross spreader of the timbers in

(Testimony of Clark Rankin.)

the drift, and, by the way, they were 12 by 12 timbers, and they were showing considerable weight, the rings were in very bad ground, and showed weight right above the core.

Q. Where were the timbers causing the trouble in the tunnel, in what part of the tunnel?

A. At that time, that is, as of August 21, the posts throughout the tunnel that I had charge of the driving of were giving trouble practically all the way through, particularly in the north tunnel from a point about 25 or 30 feet to the west of the cross adit to the face.

Q. When you say the tunnel that you had charge of driving, you mean [1495] the part that had been driven under your supervision?

A. The part driven when I was there.

Q. Were the timbers in the sandstone section giving any trouble?

A. No, we did not have to replace any posts in the sandstone section.

Q. What did you do with the timbers which were causing trouble in the newly-excavated portion?

A. Well, we were patroling the tunnel, the walkers on shift at the time, myself, the District men, and any sign of weight and breaking of posts was given immediate attention. We had a timber crew, as I remember, we had timber men working there from June sometime until we quit, that replaced the posts as they broke.

(Testimony of Clark Rankin.)

Q. Pardon me just a minute. You said it was very heavy ground, as shown by the poster. What did you mean by that?

A. I meant to say that the timber was as shown on the poster, to take care of this ground.

Q. And by the timber you mean it required all of this spiling?

A. Spiling, breast-boarding, and the sets averaged 2-foot centers, they were 12 by 12.

Q. That means 2 feet from the center of this one to the center of this one?

A. There were 3 12 by 12 in a distance of six feet.

Q. Mr. Rankin, I show you a photograph, and I want to ask you to explain to the Judge what that shows.

A. This shows a heading of the lower drift, and this is a case where our spiling and the forward breast-boarding was giving weight, and this is the running condition of the ground that occurred at that point. The water that was in there was done away with.

Q. What date is that, approximately?

A. August 5, 1935.

The Court: Locate the tunnel.

A. It is the bottom drift of the south tunnel, as I remember it; I believe the south bottom drift of the south tunnel, if I remember [1496] right. That is my recollection at the time.

Mr. Tinning: Q. What station?

(Testimony of Clark Rankin.)

A. I could not say off-hand what station that was on August 5.

The Court: Locate it as near as you can.

Mr. Tinning: Mr. Price has the books that will do that. A. This one will give it approximately.

Mr. Marrin: May we have this offered so that we may have an exhibit number on it?

The Court: It may be admitted and marked.

(The photograph was marked "Plaintiff's Exhibit 76.")

[Set forth in the Book of Exhibits at page 290.]

Mr. Marrin: For the sake of the record, this testimony is with respect to Plaintiff's Exhibit 76.

Mr. Tinning: He referred to the top photograph shown on Plaintiff's Exhibit 76.

Mr. Marrin: Q. Can you locate that station, Mr. Rankin?

A. I would say it was a north drift from the progress report, that is, at station 124+72.

Mr. Marrin: Q. And that was at the inner face of the excavation on that date?

A. Yes, that was at the heading. This picture——

Q. The witness is now referring to the lower photograph on Plaintiff's Exhibit No. 76.

A. This picture was taken in the heading of the lower south drift of the north tunnel. It illustrates the spiling overhead, the 4 by 6 spiling, the breast-boarding of the base, and the rail blocks of the Bagley scraper.

Q. Is that the lower drift?

(Testimony of Clark Rankin.)

A. The lower right drift of the north tunnel, to the best of my recollection. I was with the photographer at the time these were taken, but that is as I remember it.

Mr. Tinning: Q. What station would that be?

A. That is at station 122+44, about.

Q. Is the photograph taken looking ahead in the tunnel, looking east? [1497]

A. The photograph is taken looking east. This illustrates the breastboarding, and you can see the end of the spiling at the face. They are just about ready to put the next set in.

Mr. Marrin: Now, I have here a series of photographs which were taken in the tunnel in the early part of August, 1935, which I would like to offer as one exhibit.

Mr. Tinning: How many are there in that group that you are offering? They are numbered.

Mr. Marrin: They are 131, 132, 133, 135, 140 and one without a number. There are six photographs.

The Court: Mark them as one exhibit consisting of six photographs.

(The photographs were marked "Plaintiff's Exhibit 77.")

[Set forth in the Book of Exhibits at page 291.]

Mr. Marrin: Q. Now, Mr. Rankin, will you explain to his Honor what this photograph shows, and the witness is now referring to the photograph marked 131, Plaintiff's Exhibit 77.

(Testimony of Clark Rankin.)

A. This photograph was taken in the south tunnel looking toward the west portal. It illustrates the cross bracing and diagonal bracing that was made necessary by the weight shown on the timbers at that location. I believe that this is in the vicinity of the first cross adit. This is a square set, approaching the 14 feet of timbers that were placed across the tunnel to hold the weight of the ground.

Q. By the braces you refer to the cross braces?

A. Yes, the diagonal bracing. These are the cross bracing and this is the square set in here.

Q. Do you know at about what station that adit was? A. I could not recall off-hand.

Q. Could you tell from this?

A. At about station 118+25, roughly, in the south tunnel. [1498]

Q. That picture was taken in the south tunnel?

A. It was taken in the south tunnel looking toward the west portal.

Q. Take the photograph marked 132, Plaintiff's Exhibit 77; will you explain what that shows?

A. This is a photograph also taken in the south tunnel on the same day looking toward the face, but some distance back. It shows in the immediate foreground the 12 by 12 segments that are ready for placing in the ring.

Q. These are the segments?

A. Yes, and beyond that the jumbo on which were mounted the hoists for pulling the Bagley scraper. This, by the way, is the jumbo which was

(Testimony of Clark Rankin.)

originally designed for the job but modified to fit the use it was later put to, that is, a hoist mounted for the Bagley scraper.

Q. What was the use made of the jumbo?

A. The jumbo carried the hoist that motivated the Bagley scraper. These tracks on either side of the tracks that the jumbo moved ahead on.

Q. Now, refer to photograph 135, Plaintiff's Exhibit 77, and will you explain what that shows?

A. This photograph was taken in the south tunnel at a short distance west of the core, it shows the core and the lower and upper drift on the left-hand side of the tunnel looking toward the east. It also shows the top of the core, or the so-called ring.

Q. These at the left of the photograph are the drifts?

A. Those are the drifts as illustrated on the poster Exhibit 75. This in the foreground is the Bagley scraper.

Q. And this photograph No. 132 and this photograph No. 133 were taken on August 6, 1935?

A. That is correct.

Q. Referring to photograph 135, of Plaintiff's Exhibit 77, will you explain what that shows?

A. This photograph was taken in the south tunnel on the same day as the previous photograph. This is at the face of the ring, shows the timber in place, and the top of the core. [1499]

Q. This timber in this photograph 135 shows the timber in the ring at the top of the arch?

A. That is right.

(Testimony of Clark Rankin.)

Q. Now, referring to photograph No. 140 of Plaintiff's Exhibit 77, will you explain what that shows?

A. This is an illustration of the breastboarding at the face of the lower drift in the south tunnel; this is marked the "Lower north drift." I am not certain whether the one preceding it is marked "Lower north drift," or this one is right. There is some confusion, but these were pictures in the south tunnel, one heading into the other. This photograph shows the ring.

Q. These timbers ahead of the man as shown on the photograph were the breastboarding?

A. This represents the breastboarding and this represents a flow of water coming through.

Q. Now, refer to the photograph on Plaintiff's Exhibit 77 which is unnumbered, and which has the legend, "Showing excavation method in arch of north tunnel, F method." Will you explain what that shows?

A. This shows excavation in the arch of the north tunnel using the same system. This is the top ring. These are the ring timbers. These are the lagging that has been placed ahead and this is the core, here. This is taken on a sort of an angle. This shows the dark shaley material here, and this is a kidney, the lighter material there.

Mr. Tinning: Q. Which is the kidney of lighter material?

A. This is the kidney of lighter material shown here.

(Testimony of Clark Rankin.)

Q. Where the man is standing?

A. Yes. He is spading this lump out here in order to get in another set of timbers.

Mr. Marrin: The kidney of lighter material shows lighter on the photograph than the other material?

A. That is right.

Q. And the part of the photograph back of the man who is working with an air hammer or drill is the ground?

A. Or the face of the [1500] ring drift.

Mr. Marrin: I have one more photograph here which I would like to offer in evidence as Plaintiff's Exhibit 78.

The Court: It may be admitted and marked.

(The photograph was marked "Plaintiff's Exhibit 78.")

[Set forth in the Book of Exhibits at page 297.]

Mr. Marrin: Q. Mr. Rankin, referring to Plaintiff's Exhibit No. 78, will you explain what that shows?

A. This is a picture looking toward the west portal of the north tunnel, from a station some distance in, in fact, it is probably about 50 feet east of the station where the first cross adit carries on to the south tunnel. This is the rigging that we used to haul the cars out of the cross adit and elevate them for dumping into the heading muck cars.

Q. These timbers at the side of the tunnel are what are known as spreaders?

(Testimony of Clark Rankin.)

A. These spreaders were put in after this weight became noticeable, that started at that section.

Q. Now, did you remain in the employ of the company after the excavation operation was shut down on August 21, 1935?

A. Yes, I did. Following the shut-down of August 21, I was working on a general survey of the conditions of the tunnel, that is, a survey of the timber and things of that nature.

Q. But you did not supervise any further excavation operations for the company?

A. Not at that time.

Q. Did you ever thereafter supervise any excavation operations for the company? A. I did.

Q. Where was that?

A. On the east portal ring and at the concrete on the east portal.

Q. When were you employed on that work?

A. I believe from some time in the middle of September until about the 3rd of November.

Mr. Wittschen: 1935? [1501]

Mr. Marrin: Q. 1935? A. 1935.

Q. Did you leave the employ of the company on November 3, 1935?

A. I cannot exactly place that date; it was somewhere around there, I was transferred to other work.

Q. You were not thereafter employed on this particular work? A. No.

Mr. Marrin: You may cross-examine.

Mr. Tinning: No questions.

VICTOR G. HINDMARSH,

Called for the Plaintiff; Sworn.

Mr. Marrin: Q. Mr. Hindmarsh, what is your present occupation?

A. General superintendent for Bechtel, McCone Co., building refineries for the Standard Oil.

Q. Where is the refinery being built?

A. Richmond.

Q. Will you state your experience in construction work, Mr. Hindmarsh?

A. Well, I started construction work in 1901 in the engineering department of the Southern Pacific Company on the Central Pacific reconstruction in Nevada, at Linden. We were building three tunnels there, straightening out the line running from, as I remember it, about 1500 feet to 4000 feet long. In 1905 I was transferred from there to the Bayshore Cut-off and took charge of the surveying on tunnel No. 1 and tunnel No. 2.

Q. That was for the Southern Pacific Company?

A. Southern Pacific Company. The latter part of 1906 I was transferred to the Dumbarton Bridge project and had charge of the engineering and the construction of the railroad bridge across San Francisco Bay, between the years 1906, the latter part of 1906, to 1910. In June, 1910 I was transferred to the Natron Cut-off in Oregon, as resident engineer of 15 miles of that line, which was let under contract, [1502] and on that job there was principally grading, a lot of bridges, culverts, and one tunnel about 600 feet long. I worked there until 1913 and

(Testimony of Victor G. Hindmarsh.)

was then transferred to Marshfield, Oregon, as resident engineer in charge of construction on about 30 miles of the road of the Willamette Pacific Railroad; this was grading, several large bridges and three tunnels ranging from 900 feet to a mile long in the Coast Range. I stayed there until July, 1917, when I went to work for the Government in charge of the North Portland Shipyard, and stayed there until the armistice was signed, and I left the Government the latter part or late part of 1918 and went to work for J. F. Clark & Company, general contractors, as general superintendent, and while with them I widened a tunnel for the Northern Pacific Railroad at Corbett, Oregon, about 600 feet long, and lined it with concrete, and did considerable highway work in Eastern Oregon. I stayed with them until 1922 when I went to work for Grant, Smith & Company, as general superintendent, and was sent to California in charge of all of their California work. They were just finishing up the tunnel at Susanville, it was practically completed; they were working on the Pulgas Tunnel, at Redwood City, which was under the City of San Francisco, under Mr. O'Shaughnessy, and a highway at Sonoma County. I finished up this work in California and went to Tacoma, where we built a large highway bridge for the State of Washington, which took a little over a year's time to build, and I was transferred to Chelan, Washington, in charge of a project for the Washington Power Company, on which

(Testimony of Victor G. Hindmarsh.)

Grant Smith had the contract; this consisted of two and a half miles of tunnels and a dam and a power house. I worked there until the fall of 1927, when we finished the project, and I went with the General Construction Company as general superintendent in charge of all their outside work; this consisted of a lot of canal work in Eastern Oregon, the Bureau [1503] of Reclamation, a railroad from Nissa, Oregon, to the Owyhee Dam, and when we finished the railroad we were successful contractors on the Owyhee Dam, and on this railroad there was a 600-foot tunnel. Then I worked on the dam, on which there was a diversion tunnel 30 feet in diameter, mostly, and 300 feet of it, I believe now, was 40 feet in diameter, and the shaft, 300 feet high, was 30 feet in diameter. I left there in the middle of 1930, went up to Alberta, Canada, and built a canal for the City of Calgary across the Elbow River, which was in connection with the City Water-Works, and a filtration plant for the City. I completed that job in the spring of 1932 and came to Sunnyvale, California, and went to work for J. H. Pomeroy Company, as general superintendent on the Sunnyvale Hangar, and worked with him until February, 1934, when I went to work for W. A. Bechtel Company, and while I was with them I estimated a good many jobs and was bidding work most of the time till, I believe, February of 1935, I went to work for Bridge Builders, Inc., of which the Bechtel Company was a stockholder, and had charge of the

(Testimony of Victor G. Hindmarsh.)

painting of the Bay Bridge, which the Bridge Builders had a contract for, and also estimated work all over the United States for the company until September, 1935, I went to work for the Six Companies of California as general superintendent of the construction of the Broadway Tunnel.

The Court: What date was this?

A. September 5, 1935. [1504]

Mr. Marrin: Q. What were your duties as general superintendent of construction for Six Companies of California, Mr. Hindmarsh?

A. I had charge of all the construction work, both inside and outside of the tunnel.

Q. Did you examine the Broadway Low Level Tunnels which were being constructed by Six Companies of California about the time you were employed as general manager?

A. Yes, I examined them.

Q. Will you describe the condition of the north tunnel at the time, as you observed it?

A. Well, the north tunnel: there had been a cave-in, in the north tunnel, at about Station 114; it filled the tunnel full; the north tunnel had been driven about, as I remember it, 1000 feet, fully excavated and timbered.

Q. How far had the concrete lining been placed in the tunnel?

A. The concrete was in about 170 feet.

Q. What was the condition of the timbering, as you observed it?

(Testimony of Victor G. Hindmarsh.)

A. The timber was not in bad condition; some of it showed considerable weigh and showed considerable of it had moved into th. concrete, considerably; but did not see that there was any immediate danger of collapse of any part of the tunnel; there was very little of it broken. Some of it showed weight, from crushing in at the adit rather than anything else; and one or two of the segments had broken; but, outside of it being moved in or pushed in, so it would have to be moved to concrete, why, the tunnel was not in bad condition.

Q. Would all of the timbers have to be moved back?

A. No; I would say there was probably in the neighborhood of 50 per cent of it that had to be moved.

Q. Where was most of the timbering that had to be moved back?

A. Most of it was in the north tunnel, from the adit at Station about 118 and over to the heading.

Q. That would be from this adit, which is shown—I am now referring to Plaintiff's Exhibit 74, and the longitudinal sections [1505] of the tunnels on there, and referring to the adit shown on there that is furthest toward the westerly end; and you stated the heavier condition of the timbering was from this adit up to Station 114 in the north tunnel?

A. 118 in the north tunnel.

Q. From about 118?

(Testimony of Victor G. Hindmarsh.)

A. Yes; right in here, which is about Station 118, or 117+75, up to Station 122; right in here, some place.

Q. Mr. Hindmarsh, what was the condition of the timbers in the south tunnel?

A. The south tunnel was considerably better; it had not shown the movement that it did in the north. Around the adit, at practically the same station in the opposite tunnel, it showed some pretty heavy moves in there; and, of course, those moves—that had moved considerably, especially the posts; but the rock,—the rest of the tunnel had not moved very much. From the portal up to the adit, the timber was practically not moved at all; but, from the adit up to the face, some of the posts had been moved, and a good many of the segments and the caps had lowered so they encroached into th concrete, and would have to be either trimmed heavily or moved off the concrete, or something would have to be done.

Q. What did you do after taking charge of the work, Mr. Hindmarsh?

A. Well, the first thing that was apparent to me that had to be done was to find out the exact condition of the timbers; and I made a complete survey of every set there was in both tunnels, to ascertain just how much they had encroached into the concrete, and what had to be done,—whether some of them could be trimmed or whether some of them had to be moved.

(Testimony of Victor G. Hindmarsh.)

Q. Mr. Hindmarsh, I show you here a volume of sheets which are marked "Timber Intrusion, North Tunnel," and ask you to explain to the Judge what that shows, if that is the survey to which you refer.

The Court: What is this, for the purpose of the record?

Mr. Marrin: This is a timber survey which was done under Mr. [1506] Hindmarsh's supervision. A few of the sheets were taken prior to the time he came on the work, but most of it was done afterwards; and if there is no objection I will offer it in evidence before it is used.

Mr. Tinning: Well, Mr. Marrin, could we just ascertain what you have in mind?

Your Honor, if there is going to be an afternoon recess, perhaps Mr. Marrin and I could check this up and save a good deal of time. There is no intention to delay the matter.

The Court: That is a timely suggestion. We will take a recess and you can do that.

(Recess)

Mr. Marrin: If the Court please, I think we are in agreement on this.

Mr. Tinning: May I ask a question or two, before you proceed?

Mr. Marrin: Yes.

Mr. Tinning: As I understood Mr. Hindmarsh's statement, apparently this was practically every timber, and in the south tunnel there are 182 posts, and there were 1010 feet of tunnel; that would seem to

(Testimony of Victor G. Hindmarsh.)

be a timber space of 5½ feet. I think, from what he previously said and from my own knowledge, they are a little closer than that.

The Witness: That spacing of the timber was 2 posts every 6 feet. That is after I took charge of it. Before that, I think they were a little closer together; there were 3 posts every 6 feet.

Mr. Tinning: Q. If you had a group of 3 timbers, you just took one measurement of that set?

A. Yes.

Q. So that there have been some omitted in this record of the timber measurements in the south tunnel—— A. Yes.

Mr. Tinning: That was the intention.

The Witness: That was the intention. [1507]

Mr. Tinning: Q. And, likewise, the north tunnel? A. The north tunnel, too.

Mr. Wittschen: Q. A set might consist of one or two timbers?

A. Yes; might be one or two or two or three.

Mr. Tinning: Q. If they were placed close together, they are measured as one set? A. Yes.

Q. And one measurement was taken?

A. That is right.

Mr. Marrin: I offer in evidence a volume entitled "Timber Intrusion, North Tunnel, Six Companies of California-Joint Highway District No. 13," as plaintiff's exhibit next in order.

(The volume was marked "Plaintiff's Exhibit No. 79.")

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: I offer in evidence a volume entitled "Six Companies of California-Joint Highway District No. 13, Timber Intrusion, South Tunnel," as plaintiff's exhibit next in order.

(The volume was marked "Plaintiff's Exhibit No. 80.")

Mr. Marrin: May I have Exhibit 79, please?

Q. Mr. Hindmarsh, I have selected here at random, from Plaintiff's Exhibit No. 79, one of the pages, which happens to be page 11, and I would like to have you explain that to the Judge—explain what that shows.

A. These figures here on the inside are inches; they show the clearance of the timber outside of the concrete, so that there is no encroachment in this set whatever. They are all outside of the concrete lines.

Mr. Tinning: Q. Where it says 8 inches?

A. That is 8 inches outside.

Q. Outside and above; and this is 5 inches?

A. Yes.

Mr. Marrin: This means the post which would be on the north side of the north tunnel is outside of the concrete line by 4 inches?

A. That's right.

Q. And the date at the bottom states, "Position of Timber with Relation To Prescribed Neat Lining on 9-11-1935." That is the date [1508] on which the survey was made of that particular set?

A. Yes.

(Testimony of Victor G. Hindmarsh.)

Q. At Station 115+18; that is the station in the north tunnel at which this timber set was?

A. Yes.

Q. Then, as it states, the inside figures are inches of clearance; these are the figures in here; and the outside figures are inches of encroachment? Perhaps another one would be clearer.

Referring to page 17, referring to the outside figures, "2" on the posts on the north side of the north tunnel: that means that the posts at that point encroach 2 inches within the neat line of the concrete? A. Yes.

Q. And at the lower part of the same one, the post is 2 inches outside of the neat line of the concrete? A. Yes.

Q. At the point marked "O. K." the timber is just at the neat line of the concrete? A. Yes.

Q. Then, "Date of Placing Post, 3-22-1935": that means that the posts on that diagram were placed on March 22, 1935, page 17? A. Yes.

Q. The date of placing the arch segment on 3-18-1935 means that the segments above the wall plate shown on that diagram were placed on March 18, 1935? A. Yes.

Q. And the date of the arch concrete pour, October 18, 1935, shows the date on which the concrete was poured? A. Yes.

Q. Where it says, "Measurement Obtained by Pantograph or Tape," it shows the way in which the measurement was taken?

(Testimony of Victor G. Hindmarsh.)

A. Yes; some were taken with a tape and some with a pantograph.

Q. Will you explain what a pantograph is?

A. Well, it is simply an instrument which you set up on a certain part of the middle of the tunnel, and it shows the distance any part of the arch in the tunnel is, so you can get the exact measurement,—the exact distance or position of the timber.

The Court: Q. From your center point?

A. That's right. [1509]

Mr. Marrin: Q. Whereas it shows on page 17, with reference to the cross in the square opposite the word "Tape," it means it was measured by tape measurement?

A. Yes. When we did that, we spotted a point that high, and we took measurements from that, with a tape, to each segment.

Q. When you referred, in your testimony earlier this afternoon, to timbers encroaching, you referred to the movement of the timber into the neat concrete? A. Into the neat concrete line.

Q. Lined section.

Mr. Tinning: How about this one; how was this taken?

A. Well, that was taken with a tape; I know, because I know the man who took it; he did not use the pantograph at all.

Q. It was just omitted? A. Just omitted.

Mr. Marrin: Q. This survey was taken, to the best of your knowledge, in the north tunnel, start-

(Testimony of Victor G. Hindmarsh.)

ing at Station 114+80—Would you point out where that station is, on Plaintiff's Exhibit 42?

A. Right about at that point.

Q. Was that east of the cave-in?

A. Yes; just east of the cave-in.

Q. Of course, you did not make a survey of the timber in the caved-in section?

A. No; you could not.

Mr. Tinning: Well, Mr. Marrin, this measurement that appears on page 1, appears to have been taken on the 15th of August, 1935. That was two weeks before the cave-in. I think Mr. Hindmarsh said there were some measurements taken before he was on the job.

The Witness: Yes, that's right. When they started to concrete, they found, in that section where it caved in—that was the point where they were changing the timbers, taking the timbers out, when the tunnel caved. They had taken measurements there to see what the encroachment was. [1510]

Mr. Marrin: Q. To the best of your knowledge, this contains a survey of each timber from Station 114+80 to Station 121+98 in the north tunnel?

A. Well, so far as I recollect, it does. We tried to get every timber. There may be some of them left out; I don't know; I cannot say about that.

Q. But most of the timbers?

A. Yes, most of them were taken.

Mr. Tinning: The important thing is that where-

(Testimony of Victor G. Hindmarsh.)

ever timber measurements occur here, it was accurately made and recorded?

A. That is right.

Mr. Marrin: Q. Referring to Plaintiff's Exhibit 80,—which is a similar survey of the timbers, taken in the south tunnel,—is it not? A. Yes.

Q. —that survey started at Station 114+10?

A. Yes. [1511]

Q. Did that timber survey enable you to locate where the timbers would have to be set back?

A. Yes, either trimmed or set back.

Q. About what proportion of the tunnel did you find the timbers had to be set back?

A. Well, that must have been about 60 or 70 per cent. of it.

Q. 60 or 70 per cent. of it? A. Yes.

Q. What did you do then?

A. I first started in putting in square sets in both the south tunnel and the north tunnel, wherever we thought it was necessary to either remove timbers or trim them very heavily.

Mr. Marrin: In order that we may understand what a square set is I have a drawing for illustrating his testimony which I would like to offer as Plaintiff's Exhibit next in order.

Mr. Tinning: Subject to check.

Mr. Marrin: I just want it as an illustration.

Mr. Tinning: It is not supposed to illustrate any particular timber that was put in. It is to illustrate

(Testimony of Victor G. Hindmarsh.)

a standard method of square setting, is that correct?

Mr. Marrin: That is correct.

(The drawing was marked "Plaintiff's Exhibit 81.")

[Set forth in the Book of Exhibits at page 298.]

Mr. Marrin: Q. Explain to the Judge how that square setting was done.

A. This is a typical square set.

Q. You are referring to the drawing on the left-hand side of Exhibit 81, looking at it, and that drawing shows a cross section of a square set?

A. Yes. This square set is designed so that our muck cars can go through here for taking out the debris or anything; the tunnel was not being operated at that time, but there was a lot of debris that collected in here, and had to be taken out, and it was to get in, back and forth; it was also designed so that the concreting could be placed and do very little changing to the [1512] square sets, by leaving room on both sides so that our wood form arch section could be placed right into the square set, our square sets being centered on the concrete forms.

Q. These small things at the bottom here illustrate railroad tracks?

A. That is the muck track.

Q. You erected first these posts?

A. Erected these posts with caps on and put these braces in.

Q. And then braced the timber on the edge of the tunnel to the square sets?

(Testimony of Victor G. Hindmarsh.)

A. Put stulls in wherever necessary to keep any timber that showed any weakness at all or showed any movement.

Q. That square set was for the purpose of holding the timber in the tunnel rigid? A. Yes.

Q. Until it could be concreted?

A. Until it could be concreted.

Q. Referring to the drawing on the right-hand side of Plaintiff's Exhibit 81, explain what that shows.

A. This shows a side view of the square set; the dark line in the plan represents the square set, and the two light lines represent the permanent timber.

Q. That is a view you would get if you were standing in the center looking at the side?

A. Looking at the side.

Mr. Marrin: As further illustrating that I have some photographs here, four, taken of the square setting in the tunnels, which I would like to offer as our exhibit.

(The four photographs were marked "Plaintiff's Exhibit 82.")

[Set forth in the Book of Exhibits at page 299.]

Q. Mr. Hindmarsh, I show you Plaintiff's Exhibit 82, and ask you to explain to the judge what this represents. The witness was referring first to the photograph which was marked "Typical square set."

A. I do not know exactly what station this is in, but it shows a typical square set with a railway

(Testimony of Victor G. Hindmarsh.)

opening, by which you would get the cars through, and the bracing that is taking care of it. [1513]

Mr. Tinning: Q. What size timbers are shown there? A. Mostly 12 by 12.

Q. Are those in the photograph 12 by 12 next to that man?

A. Yes, that is 12 by 12. Some of them—well, now, I would not say—there are some places we used 10 by 10, but most all of the timbering was 12 by 12; there might be a 10 by 10 once in a while.

Q. Refer now to the one marked "Typical square setted section."

A. That just shows a picture of the section that was square setted, showing the tracks all the way through.

Q. Refer now to the picture marked "Square setting of south tunnel," and will you explain what that shows?

A. That shows a typical section through the square setting along about the adit; that is the Pumcrete pipe laying there where we had used it pumping concrete up into the forms.

Q. Refer to the next photograph, marked "Square setting, north tunnel."

A. This is the square setting, as I remember it, I am not sure about it, I think this is right close to the adit in the north tunnel; that was in heavy ground there and we had to cross brace here, which shut off our track entirely.

(Testimony of Victor G. Hindmarsh.)

Q. These are typical of the square setting that was done on the tunnel following the cave-in of August, 1935? A. That is right.

Mr. Marrin: I have a drawing which was made up from company records, which shows the place in the two tunnels where the square sets were placed. I would like to offer that in evidence as Plaintiff's Exhibit next in order.

(The drawing is marked "Plaintiff's Exhibit 83.")

[Set forth in the Book of Exhibits at page 303.]

Q. Mr. Hindmarsh, will you take Exhibit 83 and point out to the Court where these square sets were placed in the two tunnels following the cave-in of August 28, 1935?

A. The square setting in the south tunnel was all of this black mark, referring to the square [1514] setting that was laid where the cave-in was.

Q. The witness is now referring to the shaded portion between station 113+49 and 114+90.

A. That was square-setted where the cave was; just ahead of the cave, 115+63 and 116+25, it showed heavy ground, and we square-set that, and we did not put any more square sets until 117+55, and it was square-set solid from there to 122+05, and in the north tunnel—that was up to what date, did you say?

Mr. Tinning: October 7, 1935.

A. I forget what date you asked me.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Oh, no. This square setting at station 125+87 to 126+90 in the north tunnel was done in February, 1936? A. Yes.

Q. That was the place of the second cave-in?

A. Yes.

Mr. Tinning: So that I can understand and not interrupt you, the date that appears above the point, here, supposed to indicate when that square setting was done, 2/22/23, 1936?

A. They were about practically that date; we worked all day on that cave-in; we did put about six square sets in.

Q. Take here between 117 plus 55 and 122 plus 05, there is a date 10/1 to 10/7, 1935.

Mr. Marrin: Those apparently indicate the date on which the square setting was done?

A. Yes. Those were in the south tunnel. That is all the square setting that was necessary in the south tunnel.

The Court: What is the distance?

A. 100 feet.

Q. How do you account for that?

A. There was considerable difference between the north tunnel all the way through than the south tunnel, the ground was heavier and broken up.

Q. How do you account for that?

A. It is pretty hard to account [1515] for it except this tunnel ran up a gulch and this tunnel was on one side of the gulch, and this on the other. That is the only way I could account for it. It seemed to

(Testimony of Victor G. Hindmarsh.)

be in a little better formation in the south tunnel than the north tunnel. We never had anywhere near the trouble in the south tunnel as the north tunnel.

Mr. Marrin: Q. The formation was different even in one tunnel?

A. Yes, there was considerable difference in the north tunnel and south tunnel.

The Court: What is this, here?

A. That is where they figured there was the Wildcat fault. That was the only place in the south tunnel it was necessary to put in square setting.

Mr. Marrin: Q. Now, after you placed the square set, what did you do, Mr. Hindmarsh?

A. During the time we were placing the square sets, as soon as we could get organized at all we started in concreting; in several places in the tunnel the steel forms were set up, in the portal, right about 200 feet of the portal on the south tunnel, and we started concreting with those forms, and we poured one pour with the forms that were set up west of the cave-in in the north tunnel; then I tore these forms down and moved them to the south tunnel and through the adit and back into the east end of the cave-in and set them up in there ready to pour concrete, and while we were doing this we were continuing with the square sets and also building wood forms where we thought it was going to be necessary to use wood forms for concreting before the square sets could be taken out.

(Testimony of Victor G. Hindmarsh.)

Q. In concreting where the square sets were did you use steel forms or wooden forms?

A. No, it was necessary to use wood forms.

Q. Referring to Plaintiff's Exhibit No. 81, these wood forms were built right in behind the square sets, were they?

A. Yes, the square sets were designed purposely so that the wood forms could [1516] be built right in them.

Q. What did you do with the braces that ran from the square sets to the timbers?

A. When we got ready to concrete, before we arrived at these lagged concrete forms the wood stulls were cut off and steel stulls where necessary were provided to take their place, and they were concreted right in, left right in the concrete.

Q. Why did you substitute steel for the wood?

A. So that it would not be necessary to take the wood out of the concrete afterward.

Q. In other words, if you had left the wood in there you would have had to take it out?

A. You would have to botch around it and then remove it and fill that portion up with concrete afterward.

Q. By substituting steel you were permitted to leave that in the concrete? A. Yes.

Q. Why didn't you use the steel forms in this section?

A. You were unable to remove your square sets before it was concreted, and you could not move the steel forms in where the square sets were.

(Testimony of Victor G. Hindmarsh.)

Q. What was the purpose of the square sets, Mr. Hindmarsh?

A. Well, there were two or three reasons for square-setting. One reason was that the Industrial Accident Commission had given the Six Companies an order that they could not move any of the timbers or trim them without first square-setting. Then another reason was to stop any movement, any further movement, if possible, until we could get the tunnel concreted.

Q. And the square sets held the timber until the concrete could be poured?

A. Yes. Another reason was where we had to use wood forms we could use the square sets for centering on the wood forms.

Q. How long were these wood forms left on the concrete?

A. To the best of my recollection we generally left the forms on for about seven days after concreting. [1517]

Q. Could those forms be re-used?

A. Well, a good deal of it could by tearing them all to pieces, you could salvage it and rebuild it, that is the only way.

Q. In other words, these forms are built right in place? A. Yes.

Q. And the steel forms were not built in place but were built ahead of time and moved into place?

A. They were complete forms built on a heavy jumbo that moved right into position.

(Testimony of Victor G. Hindmarsh.)

Q. Did you place the concrete consecutively in the tunnel after the cave-in?

A. No, we placed it wherever it was possible to get in a form and place it. Our object was to get it concreted as soon as possible; wherever we could get a section ready either with wooden forms or steel forms we poured it, and we made a good many jumps in between the concreting, that was afterwards closed in.

Q. In other words, you finally got it all concreted? A. Yes.

Q. Most of the concreting in the north tunnel was done back of the cave-in, was it not?

A. Up to about station 119+50, as I remember it, from just east of the cave-in up to station about 119+50, was all done from the south tunnel through the adit.

Q. In other words you got your materials in through the adit? A. Through the adit.

Q. Did you have to take the forms in in that way?

A. Yes, the forms all had to go in; I took the forms down from the west end of the cave and cut them down so that I could get them through this 4 by 6 adit and take them through and rebuild them again in the east end of the cave-in.

Q. Was that the means by which you got the concrete into the tunnel?

A. It was pumped with the pumpcrete via the pump line, from the pumpcrete gun we run through

(Testimony of Victor G. Hindmarsh.)

the adit, and then to wherever we were concreting in the south tunnel, some distance, I think the maximum distance was probably 750 or 800 feet. [1518]

Q. And all of the men had to go through that?

A. Everything had to go through the adit. That is the only place they could go through.

Q. At that time there was another adit made between the tunnels. Was that of any use to you?

A. No, that was not any use at all, on this work. It would serve if anything happened for the men to escape, but at the time that was driven it was driven as close as possible to the bench in the south tunnel and the south tunnel was considerably ahead of the north tunnel; it came out in one of the small drifts in the north tunnel.

Q. In other words, referring to Plaintiff's Exhibit No. 43, this is the second adit. A. Yes.

Q. At about Station 123?

A. Yes, that is right.

Q. And in that north tunnel that adit came into a drift? A. Yes.

Q. And consequently it was of no use in getting material back of the cave-in portion. A. Yes.

Q. You employed Mr. Larson to help you remove the cave-in?

A. Yes, that was one of the first things I really did after I took charge, was to employ Mr. Larson to remove the cave-in.

(Testimony of Victor G. Hindmarsh.)

Q. Did you do any resetting of timbers while you were engaged on this square setting?

A. I don't recall that I did. I do not think so.

Q. Now, when was the excavation resumed on the north tunnel following the cave-in, Mr. Hindmarsh?

A. In the north tunnel I think it was sometime in December, the latter part of December, 1935, as I remember it.

Q. And in the south tunnel?

A. In the south tunnel it was in November, somewhere around the 20th, or 23rd, or 24th of November.

Q. Of 1935? A. Yes.

Q. Had it taken up until that time to complete the concreting of these tunnels?

A. Yes, we had concreted at that time almost [1519] to the face in both tunnels when they started excavation.

Mr. Marrin: I have here, gentlemen, a copy of a letter from the Industrial Accident Commission to Six Companies authorizing the resumption of driving in the tunnel, which I should like to offer in evidence.

Mr. Wittschen: Was a copy of this letter sent to the District?

Mr. Marrin: It has noted on there copy to Joint Highway Commission #13.

Mr. Tinning: No objection.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: I offer that in evidence as Plaintiff's Exhibit 84.

The Court: It may be admitted and marked.

(The letter was marked "Plaintiff's Exhibit 84.")

Mr. Marrin: This is a letter on the letterhead of the Industrial Accident Commission, State Building.

PLAINTIFF'S EXHIBIT NO. 84

Industrial Accident Commission
State Building

San Francisco
November 22, 1935

The Six Companies,
Stock Exchange Bldg.,
San Francisco
Attention: S. Bechtel

Gentlemen:

It appearing from a report submitted to the Industrial Accident Commission under date of November 21, 1935, by L. K. Reinhardt, Supervising Construction Engineer of the said Commission that all sections of the Broadway Low Level Tunnel located in Alameda and Contra Costa Counties are free from the hazard of caving, and that the South tunnel is ready for driving, you are hereby notified that the Industrial Accident Commission herewith and hereby grants the Six Companies permission to resume

(Testimony of Victor G. Hindmarsh.)

the driving of the South Tunnel, pursuant to the Safety Laws of California.

Yours very truly,
(Signed) T. A. REARDON,
Chairman, Industrial Accident Commission.

FJB:RN
cc: Joint Highway Commission #13
1448 Webster St.,
Oakland, Calif.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's. Ex. No. 84. Filed May 4, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk. [1520]

Mr. Marrin: Did you receive permission from the Industrial Accident Commission to resume driving of the north tunnel?

A. That was either received as an order or in a verbal order from Mr. Rhinehart; I don't remember which it was. He was in close contact with the tunnels all the time; and I collaborated with him considerably during the driving.

Q. That permission may have been oral?

A. May have been oral; I don't remember.

Q. Will you describe the method of excavation which you pursued when you resumed excavating in the tunnel, Mr. Hindmarsh; and, in doing so, you may, if you desire, refer to Plaintiff's Exhibit 42,

(Testimony of Victor G. Hindmarsh.)

which shows the different methods of excavation used in the tunnel?

A. In the south tunnel, when we started excavations, we used the three-drift system, starting from about Station 125, as I remember it, and using this system until we connected with the wall plate system that was driven——

Mr. Marrin: Pardon me. The witness is referring to a system designated as "I" in Plaintiff's Exhibit 42.

Mr. Tinning: When Mr. Hindmarsh says "the three-drift system," he was referring to "I"?

Mr. Marrin: Yes.

The Witness: Yes.

Mr. Marrin: Yes.

Mr. Tinning: There were three drifts on each side?

A. Three drifts on each side. We continued this three-drift system until we connected up with the wall plate drifts that were driven from the east end a distance of approximately 600 feet. After these drifts were fully excavated and we placed the permanent posts in these drifts, and also the "A" segment on both sides of the tunnel, and then the next operation we trapped the ring section which was let down into the three drifts and left that material there until such time as we could take the core out with the shovel. That [1521] all came out then at the same time, when the ring was completed.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Q. Now, that section which you have described as "I" is shown on the longitudinal section of the tunnel drawing on Plaintiff's Exhibit 42, and is marked "I", and runs from about what station? A. Station 124+80 to 131+20.

Q. At Station about 131+20, you intersected, or you contacted the wall plate drift which had been driven from the east end? A. That is right.

Q. Those are illustrated on this exhibit, by the diagram marked "K"? A. Marked "K."

Q. And from the point of intersection with the wall plate drifts from the east end, what system of excavation did you follow in the south tunnel?

A. We followed the wall plate system entirely then, which is shown on this Exhibit 42 as "G."

Q. And it shows on the longitudinal section, by the same color, marked "G"? A. Yes.

Q. What system of excavation did you follow in the north tunnel, Mr. Hindmarsh?

A. When they stopped excavation in the north tunnel, on the 21st of August, they were using——

Q. 21st of August, 1935?

A. 1935——they were using a two-drift method, a bottom drift on each side of the tunnel, and one drift immediately above that.

Q. That is illustrated by the diagram marked "F" in Plaintiff's Exhibit 42?

A. Yes, sir. The bottom drift, as I recollect, was about 100 feet. I completed the second drift that same distance the lower drift was completed to,

(Testimony of Victor G. Hindmarsh.)

and took the ring out for that distance, completing the timbering in full section up to that point; but, from there on, I changed the system into the wall plate method, which was the "H" section.

Q. As shown on Plaintiff's Exhibit 42?

A. As shown on Plaintiff's Exhibit 42; and continued with the "H" section then until we stopped on June 13th. [1522]

Q. Would you point out at about what station you started the excavation on the north tunnel, on Plaintiff's Exhibit 42?

A. It was approximately 122+11, where the bench was.

Q. And you followed the method known as "F" section to Station about 123+47? A. 123+47.

Q. From that point on——

A. From that point on, I followed the wall plate method, or the "H" section, as far as we went in the tunnel.

Q. What station was that, as far as you went in the tunnel.

A. That is just 131+40; about that.

The Court: That method, in blue on the south tunnel, is it just the same, or is it different?

A. Well, there is a little difference, your Honor, because the wall plate drifts were a little different. They were drifts that were driven from the east end, and they were much larger drifts than these drifts we pursued in the north tunnel.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Now, I have here some photographs showing the type "I" method of timbering in the south tunnel. There is a series of three photographs, which I would like to offer as one exhibit.

(The three photographs were marked "Plaintiff's Exhibit No. 85.")

[Set forth in the Book of Exhibits at page 304.]

Mr. Marrin: Q. Mr. Hindmarsh, referring to the first of these photographs, Plaintiff's Exhibit No. 85, which is marked showing type "I" method of timbering in south tunnel, will you state what that represents?

A. Well, this shows another section in the south tunnel where it was driven by the "I" method; it shows no wall plate. You will notice they are all individual sets. This was taken from the bench, looking back.

Q. In other words, this is looking toward the portal? A. Yes.

Mr. Tinning: Mr. Hindmarsh, so I may understand you, these were posts that you put in before you took out the core; you put them [1523] in as you went ahead?

A. Yes. Well, after the drifts were driven clear through, then I went in and set all the posts for the 600 feet, and the "A" segment.

Q. The "A" segment is the first part of the circle above the plumbpost?

A. That's right. It shows the concrete Jumbo back of the timber and the section being concreted when this picture was taken.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Referring to the second photograph, marked "Type 'I' Method Timbering South Tunnel," that shows the same method of timbering, does it?

A. Yes, that shows the same method of timbering.

Q. In the south tunnel which was done under your supervision? A. Yes.

Q. And referring to Type "I" excavation and timbering method, which is the third photograph of Exhibit 85——

A. This was in the south tunnel.

Q. Shows the posts?

A. Shows the posts and cross-bracing,—the first cross-bracing; it does not go high enough to show the second bracing.

Q. Well, there is another set?

A. The cross-bracing just above this.

Q. Those photographs are typical of the method of timbering that was carried on under the so-called Type "I" method? A. Yes.

The Court: You are coming this way, are you?

A. Well, no; going the other way—yes, the concrete is coming this way.

Mr. Marrin: This way is the portal into the tunnel?

A. The portal is that way; and that is the electric shovel, sitting right there.

Mr. Tinning: Could I ask Mr. Hindmarsh a question?

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Surely.

Mr. Tinning: In the first of these photographs, where we are [1524] looking back toward the portal of the tunnel, where do those braces appear when you get your concrete in? Did you take those out?

A. Took those out as we came ahead.

Q. So that between where the camera was and where the Jumbo was, you had taken out those cross-braces?

A. Yes. We were getting ready to move the Jumbo ahead. We had about 27 feet.

Q. You cleared those out in that space?

A. Yes.

Mr. Marrin: Q. Mr. Hindmarsh, referring further to the first photograph, on the right-hand side of the photograph, which would be the south side of the south tunnel, would you explain what this material is here?

A. That is the north side.

Q. Yes.

A. That is Gunite material, which is inserted between the timbers so as to strengthen the timbers.

The Court: Q. To strengthen it?

A. To strengthen it; makes them all work in unison. That was Gunite shot in between the timbers and cemented.

Mr. Marrin: Q. Will you explain why the Gunite was placed in the timbers, Mr. Hindmarsh?

A. Well, the Gunite was placed there to strengthen the timbers and give them more support,

(Testimony of Victor G. Hindmarsh.)

as we were having trouble with the timbers moving, and wanted to try to hold them until such time as we could get the concrete in to save trimming.

Q. Did you have trouble with the timbers moving in the part of the tunnel that you excavated?

A. Yes; I had considerable trouble with them; in fact, they would move practically constantly from the time it was excavated until you got the concrete in.

Q. What was the formation through which you excavated the tunnel?

A. It was mostly cherts; possibly 450 feet of Orindan.

Q. Over half of your excavation in the tunnel was in the cherts formation?

A. Yes; all the north tunnel was cherts, and about half the south tunnel was cherts. [1525]

Q. You found that after you set the timbers, they commenced moving in? A. Yes.

Q. How rapid was that movement?

A. Well, it varied considerably. The ground was very ununiform and spotty; and it was rapid at different points; some places your timber would start moving in probably the second or third day after it was set; and they would move in progressively, somewhere around one-eighth of an inch a day up to a quarter; sometimes about half an inch a day.

Q. Now, I have here a schematic photograph showing a cross-section of the lining and Guniting,

(Testimony of Victor G. Hindmarsh.)

which I would like to offer as Plaintiff's Exhibit next in order.

Mr. Tinning: In respect to this photograph, I gather that it is not a photograph of any actual condition? This is one I have seen before in a book.

Mr. Marrin: Yes.

Mr. Tinning: And it is really a diagram; and if it goes in for that purpose, to show something in connection with the theory of your case, there is no objection to it; but I don't want to have it understood this is a photograph of any particular condition. This was worked up to demonstrate a particular theory——

Mr. Marrin: Yes; I am putting it in to illustrate the method used in Guniting between the timbers.

Mr. Tinning: Well, if it is to illustrate a method, we will object to its introduction as not being a photograph of a condition of the tunnel.

Mr. Marrin: In other words, it is simply to have the witness explain and make clear the method used in Guniting; not necessarily illustrating the exact condition, because this is painted in here on this photograph; it has been superimposed on there in the nature of a drawing. [1526]

Mr. Tinning: Well, it is to demonstrate a method.

Mr. Marrin: That is all.

Mr. Tinning: It is not indicative of anything beyond what is shown here of the concrete form. It is something that has been worked up from a

(Testimony of Victor G. Hindmarsh.)

photograph by a draughtsman or a photographer, and is simply indicative of a proposed plan as a basis of some theory?

Mr. Marrin: Yes.

Mr. Tinning: And not an actual condition?

Mr. Marrin: Yes.

Mr. Tinning: With that understanding, I have no objection.

(The document was marked "Plaintiff's Exhibit No. 86.")

[Set forth in the Book of Exhibits at page 307.]

Mr. Marrin: Q. Mr. Hindmarsh, referring to Plaintiff's Exhibit No. 86, will you explain to the Court what that shows?

A. This is a photograph that has been retouched to show a method that we used in Guniting between the timbers, to strengthen the timbers. You will see these black lines are the timber sets and the grey is the Gunite that has been shot in between.

Q. Did that Gunite contain reinforcing steel that is placed——

A. There was reinforcing steel placed between each set of timbers, strengthening it with Gunite, as well as holding it in place while it was being shot in there. This section here shows in the permanent lining of the concrete.

Mr. Marrin: The witness is referring to the arch section,—the inside of the arch section. So this photograph shows the concrete forms in place?

A. Yes; that shows the steel forms that are in place, at the time.

(Testimony of Victor G. Hindmarsh.)

Mr. Tinning: The concrete is also put in by——

A. Yes; I think that is right.

Mr. Marrin: But the interior beyond the concrete, where the concrete is put in, is apparently a photograph of the concrete? [1527]

A. Yes.

Mr. Tinning: Looking through the steel forms?

A. Yes.

Mr. Marrin: That shows the method to put in additional support for the timbers?

A. Yes, that is right.

The Court: Now, I think it is about time for adjournment. We will take a recess until tomorrow morning at ten o'clock.

(Thereupon, an adjournment was taken until Thursday, May 5, 1938, at 10 o'clock a. m.) [1528]

Thursday, May 5, 1938;
10 o'Clock A. M.

VICTOR G. HINDMARSH,

Direct Examination (Continued)

Mr. Marrin: Q. Mr. Hindmarsh, yesterday I asked you this question, which appears at page 1110 of the transcript:

"Q. Did you do any resetting of timbers while you were engaged on this square setting?

A. I don't recall that I did. I do not think so."

(Testimony of Victor G. Hindmarsh.)

In that answer, you referred, did you, to resetting of the timbers while you were doing the square setting? A. That's right.

Q. Did you do any resetting of timbers after the square setting was done?

A. Oh, yes. We reset lots of the timbers. The timbers, where the square sets were placed,—that was where most all of the ground moved, to a certain degree; and, I believe, had to be trimmed or moved; and, where it was necessary to move it, why, it was necessary to have the square sets in; and the worst place that the timbers were moved was the last place that was excavated, right up next to the face. There were timbers there,—some of the arch timbers,—segments, that moved in as much as 15 inches. Some of the posts moved in 8 or 10 inches, and that could not be trimmed,—that much off; that had to be moved back.

Mr. Tinning: Q. Mr. Hindmarsh, what station do you refer to?

A. Between station 121+50 and 122+11.

Q. That was in the north tunnel? A. Yes.

Mr. Marrin: Q. One of the purposes of the square setting was to hold the timbers while you were moving them? A. Yes, that's right.

Q. How many feet of these tunnels were excavated under your supervision, Mr. Hindmarsh?

A. About 800 feet in the north tunnel, and about 1100 feet in the south tunnel. [1529]

(Testimony of Victor G. Hindmarsh.)

Q. Would you describe the character of the ground encountered by you in excavating the tunnels?

A. Well, the cherts: all the north tunnel was in cherts; it was very spotty and ununiform, and the chert laminations had been cut by an intrusion of some mineral substance of some kind; I don't know what the geologist called it; that would cut across the laminations, in varied conditions and positions, in some places only 2 inches thick, and some places it would come in kidneys 5 or 6 feet thick; that would cut all the laminations of the cherts and take the stability away from it entirely. When we got into the Orindan, it was not as bad as the cherts; we did not have as much trouble with it as we did on the cherts, although it moved continuously from the time we put the timbers in until we got the concrete in.

Q. The ground was moving? A. Yes.

Q. About what rate did it move?

A. Well, it would move from an eighth of an inch a day to half an inch a day. Then probably it would be spotty; but some places moved faster than others. In the north tunnel, along in January, the timbers began to move rapidly, and it was necessary to stop the driving in order to catch up to the concrete so there would not be any interference, and we could get the concrete up next to the face in order to hold it; I was not able to hold the timbers.

Q. Exerted pressure on the timbers?

(Testimony of Victor G. Hindmarsh.)

A. Yes.

Q. How far outside of the neat concrete of the concrete lining did you place the timbers?

A. There was a minimum of 3 inches; up to some places in the arch, as much as 5 inches.

Q. You testified, yesterday, that in an attempt to reinforce the timbers you placed Gunite and reinforcing steel between them?

A. That's right.

Q. Did it stop the movement of the timbers?

A. Well, it seemed to in some places; and there were other places that it did not; and some of the Gunite had moved in when we came to the concrete, and we [1530] had to chip that off, as much as 3 or 4 inches.

Q. How close were you keeping the concrete up behind the excavation?

A. Probably a maximum of 125 feet. I tried to keep it there, and keep working, at the time, between there and the face. There were some places, I think, where I got as close as 70 or 75 feet to the face where I had bad ground.

Q. How long would it be, after a given section was excavated, before the concrete lining was placed?

A. Well, it would be—when it was back 125 feet, it would be approximately 10 days.

Q. During that period of time, the timbers would move in to such an extent they would have to be trimmed?

(Testimony of Victor G. Hindmarsh.)

A. In some places it moved in. We did not do but very little trimming when we got the concrete up close. It would just above move in the distance it was set up beyond the concrete line. However, there were places where it got in before we could get the concrete in, and we would have to trim it off.

Q. Did those same conditions prevail through all the ground which was excavated under your supervision? A. Yes, it did.

Q. But the cherts section was worse than the Orindan?

A. The cherts was more treachereous.

Q. Did a cave-in occur in the tunnel on February 22, 1936? A. Yes.

Q. In which tunnel? A. The north tunnel.

Q. At about what time of day?

A. Early in the morning; about 2:30; between 2:30 and 3 o'clock in the morning.

Q. On which side of the north tunnel?

A. The cave-in started on the south side of the north tunnel, just above the wall plate line.

Q. At about what station?

A. About 126+50.

Q. How long had the timbers been placed at the point where the cave-in occurred?

A. The ring timbers had been set about 10 days —10 or 11 days; and the posts had been set about 4 or 5 days.

Q. The ring timbers were set in the drifts ahead of the posts? A. Yes. [1531]

(Testimony of Victor G. Hindmarsh.)

Q. Did you state how many feet back from the face the cave-in occurred? A. About 45 feet.

Q. Were you present on the work at the time of the cave-in? A. No; I was not.

Q. How long prior to that had you been present?

A. Oh, I was in the tunnel about 8 or 9 o'clock that night before the cave-in,—probably 6 or 7 hours before the cave-in.

Q. How close up was the concrete to the face at that point?

A. It was about 125 feet, as I remember it now; that is about the way we kept it.

Q. In other words, the cave-in occurred between the place where the concrete lining ended and the face of the excavation which was about 125 feet ahead? A. Yes.

Q. Had you inspected the timbers in the north tunnel the day before the cave-in?

A. Yes. I inspected the timbers practically every day. I was in the tunnel constantly from early in the morning until 9 or 10 o'clock at night.

Q. Did they appear to be in good shape?

A. There was nothing there that—I did not see anything at all that would give any sign of any weakness.

Q. Were you in charge of the excavation at the time you drove through this particular place where this cave-in occurred. A. Yes.

Q. Did you observe the character of the ground, at the point at which the cave-in later occurred, at the time you excavated through it?

(Testimony of Victor G. Hindmarsh.)

A. Yes. We observed the ground. We had one of those intrusions or gouges that I spoke about, which was running across the tunnel on a diagonal; it started in on the north side of the north tunnel and went diagonally across the tunnel; and it varied, starting almost only 2 or 3 inches in thickness, as I remember it, at the north side; and then it widened out in the middle of the tunnel, [1532] and went diagonally across, and went out of the tunnel just about the wall plate line; and I would say it was probably a couple of feet thick there—maybe 2 or 3 feet thick at that point; and when we drove the drift there, we observed it; but it did not concern me very much; I did not pay any more attention to it, because it was well taken care of and well packed, and the gouge seemed to be considerably harder than the ones that we had just gone through back there. I did not think it would give us any trouble.

Q. You had gone through similar gouges before?

A. Yes; lots of them.

Q. What was the size of the timbers used at this particular point?

A. 12 by 12's and 14 by 14's.

Q. How soon after the cave-in occurred did you arrive at the site of the work?

A. I guess about 45 minutes.

Q. That was about 3 o'clock in the morning of the 22nd? A. Yes.

Q. Will you describe, generally, the appearance of the cave-in, at the time you arrived at the work?

(Testimony of Victor G. Hindmarsh.)

A. Well, there were about 6 or 8 sets of timbers that had fallen down, and the roof had caved, from the south side above the wall plate, and enough material had come in to cover up—to practically cover our air shovel that we had standing there working; and considerable of the timbers fell in beyond that, and all the roof timber was down on the ground; and there was one man who was caught in this timber; and they were working then to get that man free,—to dislodge him from the timbers, when I arrived; and we were successful in getting the man out, with very minor injuries; but no one was hurt; but the material then started to cave in, and kept on dropping and caving, from the south side of the tunnel, and gradually working over the roof of the tunnel; and, in order to catch it up and keep the cave from running away, further into the timbered tunnel, I started to bulkhead at the toe of the cave; and I was able to build a bulkhead as fast as the [1533] cave came in.

Mr. Tinning: Q. Mr. Hindmarsh, was that bulkhead on the west end of the cave?

A. West end of the cave; the toe of the cave; but I was just about able to keep that bulkhead ahead of the caving; it would ave and roll, and it kept falling on the bulkhead; and that night the tunnel was full, so far as we could see; but it continued to cave all that night; you could hear the big lumps caving and rolling back into the tunnel.

Q. In other words, after the first rush of ma-

(Testimony of Victor G. Hindmarsh.)

terial came in, the rest of the material came in gradually?

A. Spasmodically, yes; just kept dropping; every few minutes there would be a boulder drop out of the roof.

Q. Did it eventually fill the tunnel?

A. Yes, it eventually filled the tunnel, and filled it from the bulkhead to the excavated face of the tunnel.

Q. It would be a distance of about how far?

A. Oh, about 60 or 70 feet.

Q. Were the timbers broken?

A. No. After we took the cave out from the westerly end, the timbers were not broken; they were simply pushed out, just about the wall plate line; and that cave came in, when the kidneys came in, it started on the ring and the "A" segment there, and evidently pushed that out, and that let the rest of the ring down.

Q. Was this the system you were using?

A. No. I was using the wall plate system,—that "H" system.

Q. This segment in there? A. Yes.

Q. Above the wall plate?

The Court: Q. On the south side?

A. On the south side of the tunnel, yes. The tunnel runs east and west.

Q. And it was on the south side?

A. Yes. [1534]

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: I have here four photographs taken at the time of the cave-in; and I would like to offer them as plaintiff's exhibit next in order.

(The four photographs were marked "Plaintiff's Exhibit No. 87.")

[Set forth in the Book of Exhibits at page 308.]

Mr. Marrin: Q. Mr. Hindmarsh, I show you a photograph which is part of Plaintiff's Exhibit No. 87—I believe I will mark this No. 1.

Mr. Tinning: "87-1."

Mr. Marrin: Q. Will you explain to the Court what that shows?

A. That shows that gouge that I was speaking about; and this is the south side of the tunnel, just above the wall plate line there, and running up into the roof of the tunnel. You could readily see, in this picture, how that gouge varied; it was taken from the Jumbo,—right on top of the Jumbo, just back of the cave-in, west of the cave-in, looking in.

Mr. Tinning: Q. Mr. Hindmarsh, could you tell us about when these photographs were taken; about what hour, approximately?

A. I believe that was probably taken around, as I remember it now, 6 or 7 o'clock in the morning. I am not sure. There was so much confusion around there at that time, and I know the photographer was there, taking them. I don't know what time it was; but I think it was around about that time.

Mr. Marrin: Q. After the cave-in, did it develop that this gouge widened out, outside of the tunnel?

(Testimony of Victor G. Hindmarsh.)

A. Yes; it widened out considerably. After you got outside the skin face of the tunnel,—the lining of the tunnel,—it widened out into a large kidney; it worked up back there on the face of the tunnel, and, when we went through there taking the cave out, you could see we had some large boulders of this gouged material that was right up in the roof; that was right up there, and left there.

Q. I show you a photograph marked "2"——

[1535]

Mr. Tinning: "Plaintiff's Exhibit 87-2."

Mr. Marrin: Q. What does that show?

A. This shows the condition of the tunnel when I arrived. You can see the cave-in from up here. This shows the condition of the tunnel when I arrived there, showing that the tunnel had caved in just above the wall plate line and partly buried our air shovel with which we were excavating at the time. Just to the north of the tunnel was where the men were trapped in the timber that fell down from the roof. The roof had not caved in, but this part of the tunnel—the roof was bare there; there was timber that held it up, which had not yet caved, and which caved afterwards.

The Court: Q. Do I understand there was no roof on the tunnel where it caved?

A. The timber had all come down, your Honor, and left the rock bare there for the time being; and then started dropping and weakened and was dropping down.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Q. There had been timber there?

A. Yes; it was all timbered solid.

Q. I show you two more, marked "3." Will you explain them to the Court?

A. This is a little later picture, taken—there is the shovel there, after the cave-in had come down, and a little more completely covering the shovel. There is the shovel; and here it is here.

The Court: Q. That would be beyond——

A. Yes; the cave-in was enough to cover the shovel completely there, and went back in on the other side. That picture shows the cross-bracing that we had in at the time of the cave-in.

Mr. Marrin: Q. Picture No. 4 of Plaintiff's Exhibit 87 shows the commencement of the bulkheading?

A. That shows the commencement of the bulkheading. This bulkhead was run practically vertically, clear to the roof, to support the other timbers, so the cave-in would not run back into the tunnel.

[1536]

Q. Eventually, the caved material filled all the space back of the bulkhead?

A. Yes; all the way in, as I remember, about 70 feet.

Mr. Tinning: May I ask a question?

Mr. Marrin: Surely.

Mr. Tinning: Q. With respect to Plaintiff's Exhibit 87-2, which you said shows the condition at the time you arrived: was there a photographer there by that time or after that time?

(Testimony of Victor G. Hindmarsh.)

A. Yes, there was a photographer there. I think it was the Tribune photographer who was there at the time I got there. [1537]

Q. Was the work stopped?

A. The work was stopped in both tunnels immediately by the order of the Industrial Accident Commission.

Mr. Marrin: I have here a copy of the order of Mr. Reinhardt. I have the original that was sent by the Industrial Accident Commission to Six Companies of California, which I will offer in evidence as Plaintiff's Exhibit next in order.

(The document was marked "Plaintiff's Exhibit 88.")

Mr. Marrin: This order reads as follows:

PLAINTIFF'S EXHIBIT No. 88

Department of Industrial Relations
Industrial Accident Commission
Of the State of California

San Francisco Office	Los Angeles Office
State Building	State Building

Notice to Employer to Remedy Unsafe Conditions of Place of Employment

Legal name, Six Companies of Calif.

Office address, Stock Exchange Bldg., S. F.

Inspection made at (Place of employment) Broadway Low Level Tunnel.

(Testimony of Victor G. Hindmarsh.)

Address for mail, S. F.

Supt., Hindmarsh. No. of employees, 600.

Ins. carrier, Ind. Ind. Ex. Date, 2/22/36.

Safety Requirements

1. Due to the character of the ground through which the Broadway Low Level tunnels are being driven, you are hereby ordered to stop further driving of both tunnels until such time as future plans for driving are approved by the Industrial Accident Commission.

Recommendations explained to Mr. Hindmarsh.

Inspected by Reinhardt.

Your attention is called to Section 402(c) of the Penal Code of California, Chapters 332, 333 and 334, Laws of 1921, and Sections 34, 35, 36, 48, 49 and 50 of the Workmen's Compensation, Insurance and Safety Act of 1917 (Chapter 586, Laws of 1917), which render the maintenance of an unsafe place of employment a misdemeanor, and authorize the Industrial Accident Commission to enforce said laws.

Form 200, 95154 5-32 15M.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 88. Filed May 5, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

Q. Mr. Hindmarsh, was the original order delivered to you by Mr. Reinhardt? A. Yes.

(Testimony of Victor G. Hindmarsh.)

Q. That is his handwriting?

A. Yes, that is his handwriting.

Mr. Marrin: I have here another order of the Industrial Accident Commission dated February 29, 1936, which I will offer [1538] in evidence as Plaintiff's Exhibit next in order.

(The document was marked "Plaintiff's Exhibit 89.")

The order reads as follows:

PLAINTIFF'S EXHIBIT No. 89

State of California
Department of Industrial Relations
Industrial Accident Commission
State Building
San Francisco

T. A. Reardon, Chairman
Meredith P. Synder
Frank C. MacDonald
Members
Frank J. Burke, Secretary

Order to Correct Unsafe Conditions or to Show Cause

February 29, 1936.

To Six Companies of California,
Field Office,
Berkeley, Calif.

You Are Hereby Notified that an inspection of your Broadway Low Level Tunnel, located at Oakland, California, made on the 22nd and 28th

(Testimony of Victor G. Hindmarsh.)

day of February, 1936, by L. K. Reinhardt, Engineer for the Industrial Accident Commission, shows the existence of unsafe conditions which must be corrected as hereinafter appears. These unsafe conditions of your place of employment constitute a menace to the lives or safety of any person or persons employed thereabout and such places of employment, machines, devices or apparatus, are being operated or used in violation of the Workmen's Compensation, Insurance and Safety Laws of the State of California, and the Safety Rules and Orders of the Industrial Accident Commission of the State of California;

Now, Therefore, You Are Hereby Directed to comply with the requirements hereinafter set forth, and to notify this Commission in writing to that effect on or before March 11, 1936, or to show cause, if any you have, in writing, on or before said date, to this Commission at its office above noted, why an order should not be made forthwith by this Commission, adopting said requirements as a special safety order or orders of this Commission, prohibiting the use of said equipment in its unsafe condition and directing the attachment to said equipment of a notice to such effect. If you desire an oral hearing before this Commission upon said requirements, in place of the hearing in writing provided above, you are hereby directed to file a

(Testimony of Victor G. Hindmarsh.)

request in writing with the Commission at its office above noted, for such oral hearing before said date.

The requirements for the correction of the aforesaid unsafe conditions appear on the attached sheets.

T. A. REARDON,
Chairman,
Ind. Accident Com.
(C. H. FRY),
Superintendent of Safety.

1. Due to the character of the ground through which the Broadway Low Level Tunnels are being driven, you are hereby ordered to stop further driving of both tunnels until such time as future plans for driving are approved by the Industrial Accident Commission.

2. By reason of the severe construction hazards involved in proceeding under the present design of the tunnel, you are ordered to appoint a committee consisting of a representative of the Six Companies of California, the Joint Highway District and other interested parties, to present a future program before proceeding further with the job.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 89. Filed May 5, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk. [1539]

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: I think that the District received an identical order, did they not?

Mr. Tinning: I believe that is correct, I do not seem to find it chronologically.

Mr. Marrin: Will it be stipulated, subject to check, that the District was sent a copy of that order?

Mr. Tinning: Yes, we will stipulate that the District received a copy of it, if I find that is correct.

Mr. Marrin: Q. Mr. Hindmarsh, what was done by you after receiving these orders?

A. Well, the tunnel was shut down completely, we were not working any further, and I talked to Mr. Reinhardt to ascertain what would be necessary, and what kind of a program [1540] or plan would be acceptable to the Commission so that we could make up a proposed plan and submit it to him on the meeting that they called for.

Mr. Wittschen: Mr. Marrin, I did not object to the question asking what he did, but if he is going to say as to what Mr. Reinhardt said I think that is objectionable.

Mr. Marrin: Yes, I think that is beyond the question.

Q. So far as the work was concerned, Mr. Hindmarsh, no further work was carried on for the time being? A. No.

Q. The work was shut down?

A. Shut down.

(Testimony of Victor G. Hindmarsh.)

Q. This order applied to the south tunnel as well as the north tunnel? A. Both tunnels.

Mr. Marrin: I have here another order of the Industrial Accident Commission, addressed to the Six Companies of California, dated March 16, 1936, and I will offer that in evidence as Plaintiff's Exhibit next in order.

(The document was marked "Plaintiff's Exhibit 90.")

It reads as follows:

PLAINTIFF'S EXHIBIT No. 90

Industrial Accident Commission
State Building
San Francisco

March 16, 1936.

Six Companies of California,
1522 Latham Square Building,
Oakland, California.

Gentlemen:

You are hereby advised that the order of this Commission to stop further driving of the Broadway Low Level Tunnels as dated February 29, 1936, is modified to the following extent:

1. Driving may be resumed in the upgrade tunnel by the contractor by following a method presented by the contractor and approved by the engineers of this Commission, which method consists in general of installing 8"x10" timber

(Testimony of Victor G. Hindmarsh.)

spreaders in each timber set and extending across the tunnel approximately 16′ and 27′ respectively above the finished floor of the tunnel; further by installing excavation equipment which may be operated beneath the lower spreader without interfering with it.

Spreaders are to be installed as soon as the ground between each timber set is excavated. Two longitudinal timbers, 2″x12″, are to be fastened to the spreaders to prevent bowing.

2. When driving in the upgrade tunnel reaches the wall plate drifts, the contractor shall present a plan for future driving for approval by the Commission.

3. An electrically operated shovel will be permitted.

4. A record shall be kept by the Fire Bosses on each shift of all overbreaks above the wall plate line and notations made whether the overbreak was in running ground and then lagged or if the overbreak was packed with timbering. If the ground warrants guniting, the gunite ring shall be constructed.

5. The core in the tunnel section shall be benched sufficiently to provide safety against caving ground to the workmen drilling lifter or similar holes.

6. The caved-in section of the downgrade tunnel may be excavated and concreted in a manner similar to that employed in doing like

(Testimony of Victor G. Hindmarsh.)

work from the caved-in section of August 28, 1935.

With the exceptions above specified, the original order of this Commission made on February 29, 1936, is still in effect and in no event shall driving in the downgrade tunnel be resumed until plans for future driving in that tunnel are approved by this Commission and said original order is hereby extended until such plans are presented and approved by this Commission.

Very truly yours,
(Signed) T. A. REARDON,
(Signed) FRANK C. MacDONALD,
Members,
Industrial Accident
Commission.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 90. Filed May 5, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk. [1541]

Q. Now, when was the driving resumed in the south tunnel, Mr. Hindmarsh?

A. I think it was on the 23rd of March.

Q. This order is dated March 16. Would you state why you delayed resuming driving until March 23rd?

A. When the Industrial Accident Commission ordered us to put these spreaders below, the present equipment that we were using for excavating the

(Testimony of Victor G. Hindmarsh.)

tunnel would not work, the shovel was too high and would interfere. We had to work under these timbers, and our shovel was too large, it would not work under the timbers without knocking them out, and they would not allow us to use it, so we had to find a shovel then that would work under that 16 feet, and there was only one on this western coast, which was down on the Metropolitan Tunnel, built specially for the Metropolitan Tunnel, and we immediately bought that shovel and had it shipped up here, and that was as quick as we could possibly get this shovel out and get the other one in. That delayed our work that length of time.

Q. That required a specially-built shovel to work under the timbers?

A. Specially built, of any size at all, that was a yard shovel, to handle that class of material; we needed it especially in the Orindan, and there was only one shovel of that size on the coast, and there were only two other ones made, and they were busy in the East.

Q. Mr. Hindmarsh, will you point out where that slide was on the longitudinal sketch of the section shown on Plaintiff's Exhibit 42?

A. It was about station 126+50, as I remember it, right there.

Q. That was the center of the slide, 126+50?

A. That was about the center of the slide.

Q. How far did it extend either side of that point?

(Testimony of Victor G. Hindmarsh.)

A. It extended possibly 30 or 40 feet each way.

Mr. Marrin: Mr. Tinning, I am not sure that our stipulation [1543] covered that prior exhibit. I think I said you received a copy of it. As a matter of fact, you received an identical original?

Mr. Tinning: We received an order, as I remember it, addressed by the Commission to the District. In other words, I think it is very much the same, they sent one to the District as the owner and one to you as the contractor.

Mr. Marrin: How about this last letter?

Mr. Tinning: They received a similar letter, also.

Mr. Marrin: I have here a copy of an order issued by Mr. Reinhardt, of the Industrial Accident Commission to the Six Companies of California, which I would like to offer in evidence as Plaintiff's Exhibit next in order.

(The document was marked "Plaintiff's Exhibit 91.")

This order reads as follows:

(Testimony of Victor G. Hindmarsh.)

PLAINTIFF'S EXHIBIT No. 91

Industrial Accident Commission
of the State of California

San Francisco Office
State Building

Notice to Employer to Remedy Unsafe Conditions of Place of Employment

Legal name: Six Companies.

Office address: Latham Square Bldg., Oakland.

Inspection made at: Broadway Tunnel.

Address for mail: Latham Square Bldg.

Supt.: Mr. Hindmarsh.

No. of employees: 300.

Ins. carrier: Ind. Ind. Ex. Date 3/30/36.

Safety Requirements

1. Slope face of core in South Tunnel to approx. 45°

2. Provide jump sets in both top drifts in North Tunnel thro caved section.

3. Block up broken segments over tunnel drifts.

Complied with 3/31

L. K. R.

Recommendations explained to Mr. Whitmire.

Inspected by Reinhardt.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 91. Filed May 5, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk. [1544]

(Testimony of Victor G. Hindmarsh.)

Mr. Wittschen: You will stipulate we did not receive a copy of that order?

Mr. Marrin: I think you did not receive a copy of that.

Q. This order required you to keep the face of the core on a 45° angle, did it not? A. Yes.

The Court: What do you mean by that?

A. On a 1 to 1 slope, in other words, one foot down and one foot out.

The Court: I understand now.

Mr. Marrin: Q. Did Mr. Reinhardt tell you why he was making that requirement?

Mr. Wittschen: Just a moment. That is objected to as immaterial, irrelevant, and incompetent, and calling for hearsay testimony, and not binding on the district.

Mr. Tinning: The order is the final evidence.

Mr. Wittschen: The order, as Mr. Tinning says, is the final evidence, and the contractor, by the plans and specifications, agreed to be bound by all of the rulings of the Industrial Accident Commission, and what Mr. Reinhardt told him is not binding on the District.

The Court: Mr. Reinhardt is a public official, is he not?

Mr. Wittschen: He is an inspector for the Industrial Accident Commission.

The Court: I will allow it subject to the motion to strike and over the objection.

Mr. Wittschen: Note an exception.

(Testimony of Victor G. Hindmarsh.)

A. Read the question.

The Court: A 45° angle.

A. To make a safer condition so that the material on the upper part of the core would not cave down on to the men that were working underneath.

Mr. Marrin: Q. Did that requirement, Mr. Hindmarsh, in any way [1545] delay the work?

Mr. Wittschen: Objected to as immaterial.

The Court: I will allow it.

Mr. Wittschen: Exception.

A. It slowed up the work because it was necessary to keep another crew of men up on the top bench sloping this ground back; a 45° slope is a pretty heavy slope to carry on any tunnel, and it makes it hard to get in your timber, and it makes it very difficult to do—all of the top bank has practically to be handled by hand, the shovel cannot reach it.

Q. It makes the work more expensive?

A. It pretty nearly doubles your crew on the bench.

The Court: Q. In any event, it was only 70 or 80 feet?

A. No, this was in the other tunnel. He was not talking about the slide, this was driving ahead.

Mr. Tinning: This was excavation.

Mr. Marrin: These orders applied to the entire balance of the excavation in both tunnels.

I have here an order of the Industrial Accident Commission dated April 16, 1936, addressed to Six

(Testimony of Victor G. Hindmarsh.)

Companies of California, which I will offer in evidence as Plaintiff's Exhibit next in order; and inasmuch as that refers to a diagram I should like at this time to offer in evidence a copy of the diagram. They may be marked as one exhibit, the letter of April 16 and the diagram which was numbered 119.

(The documents were marked "Plaintiff's Exhibit 92.")

[Set forth in the Book of Exhibits at page 313.]

[1546]

Now, there are a number of matters in there which I think may bear explanation so that your Honor will understand it.

Mr. Wittschen: We did not get a copy of that drawing.

Mr. Marrin: Didn't you get a copy of it?

Mr. Tinning: We have got it here, but this drawing which is introduced as a part of your Exhibit No. 92 was sent by the Six Companies to the Industrial Accident Commission; it was something prepared, apparently, by Six Companies, and that was not submitted to the District, and I am advised that this is the first time [1548] the District has ever seen the diagram.

Mr. Marrin: Did you get the letter?

Mr. Tinning: We got the letter.

Mr. Marrin: In other words, you received the letter from the Commission dated April 16, 1936, addressed to the District, which was identical with the letter received by the Six Companies?

(Testimony of Victor G. Hindmarsh.)

Mr. Wittschen: We received a copy of the letter addressed to you.

Mr. Tinning: I think it is addressed to the District, but the point is you have introduced this as one exhibit, and I wanted the record to be clear that the diagram which forms a part of Plaintiff's Exhibit 92, as you have introduced it, was not something that the Industrial Accident Commission sent to us as a plan for doing this work; it was taken to the Industrial Accident Commission by the Six Companies.

Mr. Marrin: However, with the knowledge of the District Engineer, was it not?

Mr. Tinning: It was discussed with the District Engineer, but the plan, itself, was something that was not received by the District, and it was something that went from the Six Companies to the Industrial Accident Commission.

Mr. Marrin: That is correct.

The Court: Did the District Engineer have knowledge of it, did he know about it?

Mr. Tinning: Yes.

The Court: The drawing, as well?

Mr. Tinning: No, we did not have knowledge of the plan or drawing.

The Court: In any event, you are not taken by surprise by this drawing?

Mr. Tinning: No, we are not misled. [1549]

The Court: Proceed.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Q. Will you explain to his Honor, —in the first place this letter refers on the drawing to 8 x 10 timber spreaders.

A. That is these spreaders across here, these are 8 by 10. When we had the other shovel in the tunnel we were using top spreaders and top hangers, and then when we had the cave-in the Industrial Accident Commission made us put these additional spreaders across at a lower level.

Q. And it was because of the lower spreaders that the shovel and equipment which you had could not operate?

A. Yes, the shovel would not work under these spreaders, which had to be every six feet across there.

Q. And the hangers which are referred to are these 2 by 12 that go up and down vertically?

A. 2 by 12 spiked to the top spreader and to the bottom spreader, and the horizontal timbers are spiked on the top of the spreader, one on each side, to keep the timbers from bowing.

Q. Now, referring to the diagram at the bottom of the drawing, No. 119, will you explain to the Court what batter posts are, as shown on there?

A. These posts show batter under the wall plate, they are the ones that they refer to. The reason those were used was in keeping the bench on a slope —this diagram only shows about a 20° slope, and we had to keep on about a 45°, and in order to cut down this distance from where the wall plate came

(Testimony of Victor G. Hindmarsh.)

out of the wall plate drift to this post, we tried to put in a batter post.

The Court: Indicate it on there generally.

A. This is the wrong section; looking from the side you see this post, this is the post, only it is inclined the other way. This stuff comes down here at a 45° angle; your toe is away out here in the wall plate drift at this point, and there is so much dis-

[1550] tance there that we run a batter post to shorten that unsupported wall plate.

Q. When the batter posts were installed were they thereafter removed?

A. No, as I remember they were not removed; there was a plumb post put in.

Q. The plumb posts were put in alongside of the batter posts? A. Yes.

Q. Was the balance of the tunnel excavated while you were on the work, excavated according to this method? A. Yes, they were.

Q. When was the excavation resumed in the north tunnel? A. I think on May 9.

The Court: 1936? A. Yes.

Q. And the cave-in was what date?

A. February 22.

The Court: March, April, May.

Mr. Marrin: That was sometime after the date of this order.

A. Yes, that order was issued right after we had the cave-in concreted, but we still had to clean the cave-in out, get up to the face of the material in

(Testimony of Victor G. Hindmarsh.)

the tunnel before we could go to work. There was quite a lot of debris to clean out after we received that order.

Q. You heard Mr. Larson explain the method of removal of the cave-in of 1935? A. Yes.

Q. And this cave-in was removed in substantially the same manner?

A. Well, the details of it were a little different, but I would say it was substantially the same thing.

Q. How did you remove it?

A. We ran a wall plate—the first tunnel was, the first drift through was a bottom drift on the first cave-in, and on this one we ran the wall plate drift through first and then took the distance from the wall plate down to the floor of the tunnel, where the concreted side wall was caved, and drove spiling down on 6-foot sections and took that out and put the posts [1551]in so we could get our concrete forms in clear up to the full width of the side walls, and that was carried on—the excavation being taken out alongside of the plumb posts was done in about 6-foot sections, with spiling driven all the way around on three sides of it. [1552]

Mr. Marrin: Q. If I understood you correctly, in referring to Diagram "H" on Plaintiff's Exhibit 42, you drove the wall plate through first?

A. Yes.

Q. Then that was all timbered?

A. Yes, that was all timbered.

(Testimony of Victor G. Hindmarsh.)

Q. Then, from that point, you drove spiling down to the bottom grade of the tunnel?

A. Yes.

Q. Then did you take this material out?

A. We drove spiling on both sides of that long drift there.

Q. Down this side and down the inner side?

A. Down this side and also on this side.

Q. Then you took the material out?

A. Then we took the material out, and concreted the side wall plate, yes, for possibly, I would say, 4 or 5 feet above the wall plate.

Mr. Tinning: How high would that be, approximately, from the floor of the tunnel?

A. Oh, I think that was about 19 feet, if I remember right, Mr. Tinning.

Mr. Marrin: Q. Did you take out the drift all the way through the excavation before you concreted? A. Yes.

Q. You opened this entire——

A. Opened this entire drift up.

Q. On both sides?

A. On both sides of the tunnel.

Q. Then placed the concrete in there?

A. That's right.

Q. After you did that, what did you do?

A. Then we started in from the east side of the drift, and drove spiling around the ring and took the ring out from the east end towards the west. The reason for that was: when the tunnel caved in, sev-

(Testimony of Victor G. Hindmarsh.)

eral sets of the timbers right next to—adjacent to the slide, had come down about a foot and a half, so they intruded into the concrete.

Q. That was toward the portal from the slide?

A. Toward the portal from the slide.

Q. That was on the west end?

A. On the west end; and made it [1553] almost impossible to get up high enough to still remove these timbers and drive lagging or spiling for taking out the rings. On the east end, it was all clear, because that timber had not been disturbed, so we were able to get in and start that spiling from that end, and drove spiling all the way around the circle, and took that circle out and put these timbers in; completed the timbers which were then down here, just back of the concrete.

Q. In other words, you drove your drift through, and then you started back out with your rings?

A. That is right.

Q. And you concreted the ring as you came out; or did you complete the ring, first?

A. No; we completed the ring, and then concreted it.

The Court: We will take a recess.

(Recess)

Mr. Marrin: Q. Mr. Hindmarsh, you stated, before the recess, that no work was carried on following the cave-in. Do you want to correct your testimony in that respect?

(Testimony of Victor G. Hindmarsh.)

A. Yes; I had forgotten, at the moment, that our concrete in the south tunnel was probably 250 feet back of the core, due to the fact we were changing our steel forms from modified section to standard section; and, inasmuch as we had that much space that was not concreted, we were allowed to continue the concreting up to the face of the tunnel.

Q. In the south tunnel?

A. In the south tunnel.

Q. But you did not place any concrete in the north tunnel? A. No.

Q. How long did it take to remove the cave-in material from the north tunnel?

A. From the time we were shut down, and we were able to resume operations again, it was about 75 days.

Q. The date of this letter of April 16, 1936: was that the date you completed concreting in the caved in section in the north tunnel?

A. As I recall it, that was just about the time we finished [1554] the concreting.

Q. Thereafter, you had to remove the core?

A. Yes, we had to wait a certain length of time for the concrete to set after it was concreted. I have forgotten just about how long—Probably 10 or 11 days.

Q. You could not remove the core until after that time? A. No.

Q. So, you were not in a position to resume excavation on the face until about May 9, 1936?

(Testimony of Victor G. Hindmarsh.)

A. About May 9th was as soon as we could do it.

Q. What did you do for a shovel in that tunnel?

A. Well, I was unable to secure any more electric shovels of the type that would work under the spreaders; but I had a little three-eighths yard air shovel that we had purchased to take out the former slide, and that had worked in between the concrete walls; and I used that as best I could; it was too small to handle the work and make progress, but it was the only thing we could get.

Q. You could not get another shovel similar to that which you used in the south tunnel?

A. No; there was not any more shovels available, and I contacted the manufacturer, as I remember it, to find out how soon we could get a new one,—which was about four or five months for delivery.

Q. Several places in your testimony, Mr. Hindmarsh, you used the term "timber intrusion." Would you explain what you mean by that?

A. What I mean by that is the amount the timber had encroached into the neat concrete line.

Q. For instance.

The Court: Q. It had moved into the area where the concrete was to be placed; is that it?

A. Yes.

Mr. Marrin: May I have Defendant's Exhibit G-4 and H-4?

Q. Mr. Hindmarsh, I refer you to the photograph whichs are [1555] Defendant's Exhibits H-4

(Testimony of Victor G. Hindmarsh.)

and G-4, consisting of four photographs. Was the work represented on these photographs done under your supervision?

Mr. Smith: Three photographs, I believe, instead of four.

Mr. Marrin: Three photographs, yes.

The Witness: A. No. I think this was the concrete that was on the first 100-foot section.

Mr. Marrin: Q. I mean: Was the work of removing the bad concrete done under your supervision?

A. I don't know just where this is. Is this the roof?

Q. The station number is on the back.

A. Yes, that was done—It was taken out under my supervision.

Q. In what part of the tunnel was that located?

A. That was in the first 100 feeet; it was placed with a Hackley gun.

Q. The first 100 feet on the west portal?

A. Yes.

Q. That was placed with a Hackley gun?

A. I think those are in the north tunnel.

Q. Will you state about how many square feet of that concrete in the west portal section had to be removed and treated in this manner?

A. Oh, as I remember it, there was probably a surface of maybe 250 square feet.

Q. Were you required to chip or remove any of

(Testimony of Victor G. Hindmarsh.)

the concrete in there which had been placed by Pumpcrete?

A. No; we did not. Well, there was—I think there was one place, as I remember it now, where it was placed with wooden forms, and the forms had bulged, and that had to be chipped off.

Q. That was in the caved-in area?

A. That was in the caved-in area of the first cave-in.

Q. I have here two photographs of the concrete in the tunnels, which I would like to show you; and I would like to offer these as plaintiff's exhibit next in order.

(The photographs were marked "Plaintiff's Exhibit No. 93.")

[Set forth in the Book of Exhibits at page 317.]

[1556]

Mr. Marrin: Q. I show you Plaintiff's Exhibit No. 93. Are those photographs of some of the concrete placed by you in the tunnel? A. Yes.

Q. That was placed by the use of the Pumpcrete? A. Yes.

Q. Do you know which tunnel that shows?

A. It is pretty hard to tell; I don't know which tunnel it is. I think it is the south tunnel; but it may be either one of them.

Mr. Tinning: Isn't one of them in the north tunnel and one in the south tunnel?

A. That might be; it is pretty hard to tell.

(Testimony of Victor G. Hindmarsh.)

Mr. Tinning: The straight one is in the north tunnel; and the curved, in the south tunnel.

A. Well, there are curves in both tunnels. One picture is taken from the portal, looking in; this is from the inside, looking out; so it is hard to identify or to be positive which tunnel each is.

Mr. Marrin: Q. Well, it was taken in one of the tunnels? A. That's right.

Mr. Wittschen: Can you identify the station?

A. There are no stations on there.

Mr. Marrin: It shows quite a number of stations, Mr. Wittschen.

The Witness: It shows a long distance of the tunnel.

The Court: What is the purpose of this?

Mr. Marrin: Just to show the concrete,—the placing of concrete.

Q. Mr. Hindmarsh, did you ever have any discussion with Mr. Boggs concerning an extension of time for the completion of the contract?

A. Yes, I did.

Q. Will you state when you had your first discussion with him, on the time?

A. The first one I remember was November 19th.

Q. 1935? A. November 19, 1935.

Q. Where was the discussion had?

A. It was held in the Six [1557] Companies' office at the tunnel.

Q. Who was present?

(Testimony of Victor G. Hindmarsh.)

A. Mr. Boggs, Mr. Smith, Mr. S. D. Bechtel and myself.

Q. What was said at that conversation?

Mr. Wittschen: Objected to as incompetent, irrelevant and immaterial and hearsay, and not binding on the District.

The Court: Objection overruled.

Mr. Wittschen: Exception.

The Court: Q. Proceed.

A. Why, we met there, I think some time in the middle of the forenoon; and the discussion was started in by a discussion of the general condition of the tunnels; and Mr. Boggs wanted to know about when we would be able to get the north tunnel cleaned up from the cave-in, and resume operations again; and there was other discussion at the time. We were working 48 hours, as I remember it, on catching up on the driving and concreting on the tunnel that had been—

Q. You mean you were working the men 48 hours?

A. We were permitted to work the men 48 hours while we caught that work—that part of the tunnel up; and we discussed then if that same order would allow us to go through that work on the new work at 48 hours, or whether we would go back to 40 hours; and I think, in the discussion there, that we decided that the order did not intend to go into new work, and we went back to the 40-hour work. At that time, as I recollect it, Mr. Boggs asked me how

(Testimony of Victor G. Hindmarsh.)

much time the Contractor thought he was entitled to, on an extension, for the August cave-in; and I told him I thought about 90 to 120 days would be fair. Mr. Boggs stated he did not know whether we would be entitled to that much time or not, but he would rather study it a little further before he would commit himself as to the amount of time. Then Mr. Boggs asked if I could make out a schedule showing the different operations [1558] in the tunnel and about when we thought we could complete the full project. I told him I did not want to do that, at that time, because I had not driven any of the tunnel yet, and I would rather wait until I got under operation to see what I could do, and I thought I could have him a schedule by the first of the year, showing the amount of time it would take; and, at that time, would also show the amount of time beyond our contract time that would be necessary to complete the project; and I asked Mr. Boggs, at that time, when I made out the schedule and determined the amount of time that was necessary to complete the project, whether he would be willing to sit down with me and draft a letter for an application to the Board of Directors for an extension of time; and he said when I got the schedule up he would be very glad to sit down and draft with me such a letter, so that, when it came up to him, he would know all about it and would be able to recommend it to the board of directors. [1559]

(Testimony of Victor G. Hindmarsh.)

Q. Did you thereafter prepare a construction schedule?

A. Yes, about sometime along the first of January, the latter part of December or the 1st of January I prepared a schedule showing the time necessary to compiete the whole project.

Q. Did you thereafter present that to Mr. Boggs?

A. I presented it to Mr. Boggs or took it up to Mr. Boggs' office on the 22nd of January, with a rough draft of a letter application for an extension of time.

Q. That was on January 22, 1936?

A. January 22, 1936.

Q. Did you show Mr. Boggs the revised construction schedule?

A. I showed Mr. Boggs it; we went over the schedule together.

Q. Did you show him the draft of the letter requesting an extension of time?

A. Yes, I showed him the draft of the letter that accompanied the schedule.

Q. Mr. Hindmarsh, is this a copy of the revised construction schedule which you presented to Mr. Boggs at the meeting with him on January 22, 1936? A. Yes.

Mr. Marrin: I offer that in evidence as Plaintiff's Exhibit next in order.

Mr. Wittschen: Objected to as immaterial, and not having been left and received by the District,

(Testimony of Victor G. Hindmarsh.)

and not in any way binding upon the district. I would like to call your Honor's attention to the fact that neither the letter nor the schedule were left with us.

Mr. Marrin: They were presented, however, to the District Engineer, and discussed with him, and as we will show by this witness' testimony the District Engineer advised against making the application at that time, and suggested that he make it later. We want to show the action of the District Engineer with respect to our proposed request for an extension of time at this time.

Mr. Wittschen: Neither of these will prove that.

[1560]

Mr. Marrin: They would show the discussion between this witness and the District Engineer, and what they discussed.

The Court: I will give you a record on it. I have already indicated my state of mind with relation to that testimony. You have understood that.

Mr. Marrin: Surely.

The Court: I will allow it.

Mr. Wittschen: Exception.

(The proposed construction schedule was marked "Plaintiff's Exhibit 94.")

[Set forth in the Book of Exhibits at page 319.]

Mr. Marrin: I will now offer the form of letter which was presented to Mr. Boggs by Mr. Hindmarsh.

(Testimony of Victor G. Hindmarsh.)

Mr. Wittschen: The same objection, on all of the grounds previously stated.

The Court: So that the record is clear, I understand they were offered but they were withdrawn. What was the fact?

A. Yes, I went up and discussed these with Mr. Boggs in his office and during the discussion Mr. Boggs said that he did not think it was wise to put in the application at that time so I withdrew the letter and took it back to my office.

Q. You had a discussion as to this letter?

A. Yes.

Mr. Marrin: Q. Did he read the letter?

A. Yes.

Mr. Marrin: I offer the letter.

Mr. Wittschen: The same objection, on all of the grounds previously stated.

The Court: Overruled.

Mr. Wittschen: Exception.

(The form letter is marked "Plaintiff's Exhibit 95.")

Mr. Marrin: This form of letter, if your Honor please, reads as follows: [1561]

(Testimony of Victor G. Hindmarsh.)

PLAINTIFF'S EXHIBIT No. 95

January 10th, 1936

W. B. Boggs,
District Engineer,
1448 Webster Street,
Oakland, California.

Dear Sir:

I have prepared a revised schedule for construction on the Broadway Tunnel Job, and beg to submit same to you herewith. It will be noted that completion date in the north, or down-grade tunnel is estimated to be about the 5th of October, 1936; and at the south, or up-grade tunnel, about the 18th of October, 1936.

I trust that this schedule will meet with your approval, and the present completion date under the contract can be extended by you to conform to the times fixed in the schedule. At present the completion date is provided to be May 24, 1936; but under Section 4 of the Specifications, you have the power to extend same with the approval of your directors for the causes set forth in the Specifications, which are classified principally as Acts of God, stormy or inclement weather, or any reason which in your judgment unavoidably delays the work.

I believe you will agree that the contractor has been unavoidably delayed in the performance of the work for many reasons, including

(Testimony of Victor G. Hindmarsh.)

stormy and inclement weather, particularly in the winter of 1934-1935, and other reasons, including difficulty in handling and obtaining labor, which have unavoidably delayed the work.

I will be greatly pleased to have you indicate to me whether or not you will treat this as an application for the necessary extension and submit same for approval to your Board of Directors.

Very truly yours,
V. G. HINDMARSH.

[Endorsed]: U. S. Dist. Ct. N. D. Cal. No. 20101-R. Plff's Ex. No. 95. Filed May 5, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

Q. Mr. Hindmarsh, you said that Mr. Boggs told you that he did not think you should present the application at that time. Did he give any reason for that statement? [1562]

Mr. Wittschen: I will object to that question on all of the grounds previously stated.

The Court: I will allow it.

Mr. Wittschen: Exception.

A. Yes, when he read the letter over in the first place, he said he did not think that that was the kind of letter that he thought we should put in, and that he wanted a letter giving all of the reasons why we were asking for an extension of time, and

(Testimony of Victor G. Hindmarsh.)

on each item to show the amount of time which we would want for each cause, so that when the letter came in to him and he brought it up to the Board they could strike out parts of it that they did not think we were entitled to an extension of time on, and allow other parts, that that would give him a complete record to go over.

Mr. Marrin: Q. Is that all he said?

Mr. Wittschen: The same objection.

A. No, there was other discussion in regard to the matter.

Mr. Marrin: Q. Give us everything he said.

Mr. Wittschen: I will make the same objection.

The Court: The same ruling.

Mr. Wittschen: Exception.

A. He said he thought I was a little bit optimistic in the schedule that I placed, but if I thought I could do it it was all right with him, but he said there was another reason why he did not think that we should ask for an extension of time at that particular moment, and that was in the spring of the year, it might be a late fall, and the outside work, all of the paving, which they did not want, to place on a wet fill, would be delayed, and if it was we would be entitled to an extension of time on whatever delay was necessary.

Mr. Marrin: Q. Is that all you recall of the conversation?

A. He also told me that if at such time as I presented or wanted [1563] him to accept that as an

(Testimony of Victor G. Hindmarsh.)

application for an extension of time, that it would only be a matter that the Board would reject, as they did not want to give any extension of time until their May meeting, just prior to our contract time being up, and that if we put it in then, presented it to them, they would reject it on those grounds.

Q. He advised you to delay the filing?

A. He asked me to delay it and make an application for an extension of time late in April, so they would have it before the Board of Directors on their first May meeting just prior to our contract time.

The Court: What was that date?

A. May 24.

Mr. Marrin: Q. Mr. Hindmarsh, you know, do you not, the work which had to be done by Six Companies of California at the time it stopped work on June 13, 1936 on the tunnels?

A. Yes, I know just exactly what had to be done.

Q. Will you describe briefly the work that remained to be done in connection with the tunnels?

A. Well, there was about 450 feet of excavation to complete in the south tunnel, and about 962 feet of excavation to complete in the north tunnel; the concreting was up within 125 feet of the excavation, and we would have to complete the ventilating plant, there was some of the roadway to be completed, and the outside work, none of it was completed, it all had to be, parts of the work, done on all of them.

(Testimony of Victor G. Hindmarsh.)

Q. Have you made an estimate of the time it would have taken Six Companies of California from June 13, 1936 to complete the work under the contract? A. Yes, I have.

Q. And have you shown that estimate on this graph which I show you? A. Yes.

Mr. Marrin: I will offer that as Plaintiff's Exhibit next in order.

(The graph was marked "Plaintiff's Exhibit 96.") [1564]

Q. According to your estimate, Mr. Hindmarsh, how long would it have taken Six Companies of California from the 13th of June, 1936 to complete the work under the contract? A. 204 days.

Q. And you would have completed it on January 3, 1937, according to your estimate?

A. Yes.

Mr. Wittschen: Might I ask a question?

Mr. Marrin: Yes.

Mr. Wittschen: Q. Paving on there means paving in the tunnel, doesn't it?

A. That is right. This schedule is based on the north tunnel, because at that time that was the point in connection with the completion; all of the rest of the work would be going on concurrently, and would be completed before the north tunnel would be completed.

Mr. Marrin: Q. The north tunnel would have been the last tunnel to have been completed?

(Testimony of Victor G. Hindmarsh.)

A. Yes.

Q. That would control the time? A. Yes.

Q. Now, Mr. Hindmarsh, in your experience have you driven any tunnels by the full face method?

Mr. Wittschen: Objected to as immaterial, irrelevant, and incompetent. The District is not bound by what is done in other tunnels.

Mr. Marrin: We are offering, your Honor, to show that the method proposed was a reasonable and proper method known to construction engineers.

Mr. Wittschen: The fact that other tunnels may have been driven by the full face method in other places proves no issue in this case. You might drive them in the Sierras and not drive them in the Coast Range; you would have to show the conditions were identical, and to go into the construction of other tunnels is utterly immaterial as far as this case is concerned.

Mr. Marrin: If your Honor please, on cross-examination of Mr. [1565] Larson, Mr. Price, and I believe Mr. Bechtel the defendant, itself, has gone into that matter extensively, and into other tunnels, in an effort to show that apparently that driving tunnels by the full face method is something that is rather unknown and unusual.

The Court: Limit yourself to the conditions existing here and I will allow it.

Mr. Wittschen: Take the Coast Range and this vicinity.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: You might limit it to this vicinity.

The Court: Conditions existing here. What tunnel have you in mind with relation to the geology of this, if any?

A. We drove the Pulgas Tunnel; I drove that tunnel, myself.

Q. Where is that?

A. Down near Redwood City, right here in the Coast Range.

The Court: Proceed. I will limit it.

Mr. Wittschen: That was a water tunnel.

A. That was a water tunnel 13 feet in diameter.

The Court: Proceed.

Mr. Marrin: Q. Did you drive any other tunnels in this vicinity by that method, Mr. Hindmarsh?

A. No, I did not right here in this vicinity; I did not drive any more; I have driven through the Coast Range, however, further north.

Q. Where?

A. On the Willamette Pacific Railroad.

Mr. Wittschen: I think we are pretty far away.

The Court: Q. Did the conditions compare with the conditions here in any way?

A. This was softer ground, your Honor. As it turned out to be, it was softer ground.

Q. Were they timber-supported? A. Yes.

The Court: I will allow it.

A. There were six tunnels on the Willamette Pacific; there were nine, six were driven full faced,

(Testimony of Victor G. Hindmarsh.)

fully timbered, and three of them [1566] in my division full faced and fully timbered, and that was in 1915 and they are still timbered and operating.

Mr. Marrin: Q. You have in mind other tunnels driven under similar conditions, that is, where the ground was not hard rock?

Mr. Wittschen: I object to that question as immaterial and not dealing with conditions here.

The Court: I have tried to limit the testimony to conditions existing here, the Coast Range. Without knowing very much about it, does the Coast Range extend from San Dieg- up to Oregon?

A. Yes.

Q. The formation? A. Yes.

Mr. Wittschen: I do not thi-k he claims the formation is the same.

Mr. Marrin: One of the issues is this, they represented to us at the time when we bid on this contract that this was good self-supporting ground, and we, relying upon this representation, adopted the full face method.

The Court: We will go into that at the proper time. I think I indicated I have a state of mind on that subject. If it would be helpful I will disclose it now; if it is desired by either side I will do so. I want both sides to get a record.

Mr. Marrin: Surely. We simply want to show if we were of the opinion that the ground was self-supporting that the method of driving that was

(Testimony of Victor G. Hindmarsh.)

adopted, the full face method was a reasonable method to adopt.

Mr. Wittschen: If your Honor please, I think there are quite a few cases that go to the point that you cannot ask an expert witness what he would have done in some other tunnel. Now, the fact that the Coast Range may geographically extend from some distance in the South and be bordered by the Willamette Valley on the west, it does not prove that conditions in Oregon are the [1567] conditions here. The witness, himself, said that the conditions were different in the north tunnel and south tunnel, only 100 feet apart.

The Court: The thing I had in mind was, if my memory serves me, on cross examination you developed as to all of the tunnels, and I wanted to allow the same latitude to the other side. That is the only reason. I want to limit it. I think we have wasted some time.

Mr. Wittschen: That was on cross examination of the witness. You can test a witness by asking him these questions.

The Court: But I allowed considerable latitude under those conditions, and I am inclined to consider the balancing of it.

Mr. Wittschen: Evening it up, but this is not cross examination. This is direct examination of another witness. If you kept on with that you could drag every immaterial thing in the witness may have said.

(Testimony of Victor G. Hindmarsh.)

The Court: Here is what I have in mind, I think it was developed before, one of the tunnels he dug up there is still up there, the timbers are holding.

A. That is right.

The Court: So far as the conditions there are concerned, they are not the conditions here, as they did not hold here six months. What do we accomplish?

Mr. Marrin: We accomplish only this, we show that in bidding on this tunnel it was not unreasonable in assuming that it could be excavated by the full-face method, that the method of excavation adopted in making our estimate was a reasonable one, upon the assumption which the plaintiff made from the geological report and the specification.

The Court: I am trying to limit the testimony. What other tunnels comparable to this have you in mind on the Coast Range, [1568] aside from the one you have indicated?

A. There are the Hetch Hetchy tunnels, part of them, I think, were dug with the full-face method.

The Court: I think I indicated to you yesterday I inspected that, myself, at the time.

Mr. Wittschen: That was a small tunnel, the size of the drift in one of these.

A. The Claremont Tunnel was driven by the full-face method.

The Court: Where are we now? What is before the Court?

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: I think the question perhaps has been answered, as far as your Honor will permit it, under the limitation.

The Court: Let us proceed.

Mr. Marrin: Q. Are the Parker Dam tunnels in the Coast Range?

Mr. Wittschen: No, they are up on the Colorado River.

Mr. Smith: That is a continuation of the Coast Range.

Mr. Wittschen: That is pretty far away.

The Court: That is sort of a wide jump.

Mr. Wittschen: I thought it was a hop.

Mr. Marrin: Q. Did the Parker Dam tunnels require timbering before driving?

Mr. Wittschen: Objected to as immaterial, and too far away.

The Court: The objection will have to be sustained. Let us proceed.

Mr. Marrin: Q. Mr. Hindmarsh, did you have anything to do with making the estimate which the plaintiff estimated for this contract?

A. I did not have anything to do with the details or estimate of the tunnel, itself; I estimated all of the grading work, outside of the tunnel, but I did go over the estimates in conference at the time just before the letting of the whole tunnel estimates.

Q. Had you read the specifications?

A. Yes, I had read the [1569] specifications.

(Testimony of Victor G. Hindmarsh.)

Q. Did you know the statements in the geological report?

A. Yes, I knew them.

Q. And you knew of the driving method proposed in the estimates?

A. Yes, I knew them.

Q. Is it your opinion that the driving methods proposed in these estimates were or were not reasonable, in view of the statements in the specifications and the geological report?

Mr. Wittschen: Objected to as immaterial, and not binding upon the defendant in any way, how they proposed to build the tunnel.

The Court: I will consider this during the lunch hour. We will take a recess until two o'clock.

(A recess was here taken until two o'clock p. m.)

[1570]

Afternoon Session

VICTOR G. HINDMARSH

Direct Examination (continued)

Mr. Marrin: I think there was a pending question, your Honor, and an objection to it that was made just before the noon hour.

The Court: Read the question.

(Record read.)

Mr. Wittschen: We objected to that, and we will also object as calling for his opinion.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: If the Court please, I am calling for his opinion as to the reasonableness of the estimate which was made. He has testified that he participated in the conference at which the estimate was arrived at, that he was familiar with the specifications and knew of the geological report, and he knew, also, of the driving methods which were proposed. I am asking his opinion, as an expert, as to whether he considered those proposed driving methods in the bid to be proper, in view of the statements in the specifications and the geological report.

Mr. Wittschen: In the first place—

The Court: This is off the record.

(Discussion, off record.)

The Court: I will allow the question; but I will confess at this time it does not impress me on the merits here. I say that so that you are not misled by anticipating the state of mind I may or may not have.

Mr. Marrin: Surely.

The Court: I will give them a record. Objection overruled.

Mr. Wittschen: Note an exception.

The Witness.: Would you read the question, please?

(Pending question read by the reporter.)

[1571]

The Witness: A. Yes, I think they were very reasonable.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Q. If you were estimating this work again on the basis of this case, would you estimate the same method of driving?

Mr. Wittschen: Object to that as immaterial and calling for an opinion and conclusion, and not binding on the defendant.

The Court: Objection sustained.

Mr. Marrin: Q. Will you give your reason for the previous question which you answered?

Mr. Wittschen: Objected to as immaterial and calling for a conclusion and opinion of the witness on an immaterial matter. Whatever the reasons were, they were reflected in the prices that appeared in the bid.

The Court: The objection will be sustained.

Mr. Marrin: If the Court please, he has stated his opinion—

The Court: I have listened to testimony here for the last—how many days?

Mr. Wittschen: About twelve.

The Court:—and I suppose that would be another recital of that for his reasons. Do you follow my state of mind?

Mr. Marrin: I want him to give his reasons for the last answer. He answered the question, and I wanted him to give his reasons for it.

The Court: Briefly, he may state his reasons.

Mr. Wittschen: Note an exception.

The Witness: A. Well, the reasons for driving a tunnel by full face method—

(Testimony of Victor G. Hindmarsh.)

Mr. Wittschen: Q. We cannot hear you, Mr. Hindmarsh.

A. The reasons for figuring or planning to drive the tunnel by the full face method, wherever you have got self-supporting ground, it is the fastest and most economical way to drive any tunnel; and it is also figured that way; the Contractor figures if the ground is [1572] self-supporting—and that is the reason this one was figured that way.

Mr. Marrin: Q. Mr. Hindmarsh, you knew that the estimate upon which the bid was submitted by plaintiff to the defendant in this case provided for driving a tunnel from the west end, did you not?

A. Yes.

Q. In your opinion, was that a proper method of driving a tunnel?

Mr. Wittschen: Objected to as immaterial. It was entirely within the control of the Contractor, and the last answer of the witness shows the vice of this method of testimony. Mr. Larson said he did not intend to drive by full face until he got in 760 feet. This witness concluded he would drive full face from the start.

Mr. Marrin: No; I don't think so. I asked him about the driving method contemplated in the estimate.

Mr. Tinning: He said "full face method was the most economical."

Mr. Wittschen: Probably the witness misunderstood you, and we both assumed you were talking

(Testimony of Victor G. Hindmarsh.)

about full face, because he said that was the most economical and indicated it would be entirely full face.

The Court: In any event, it is well to keep in mind the District was not bound by any method.

Mr. Marrin: This last question does not go to full face, your Honor. It goes to the question of driving the tunnel from the west end, alone.

Mr. Wittschen: Well, they could have driven it from the east end if they wanted to. There was nothing to prevent it.

Mr. Marrin: I want this witness to testify in his opinion as to whether it was reasonable, in view of the information the plaintiff had, to plan to drive it entirely from the west end.

Mr. Wittschen: I submit there is no issue on that. They could [1573] have driven it from one end or both.

Mr. Marrin: It goes to the question of time, if the Court please.

The Court: What relation has that to time?

Mr. Marrin: Well, if it should be contended that the tunnel should—

The Court: Are you anticipating the defense, now?

Mr. Marrin: No; I am not anticipating it. I am simply attempting to show the reasonableness of the method the plaintiff proposed. In other words, the plaintiff did not go to the east end with any of this work until June, 1935.

(Testimony of Victor G. Hindmarsh.)

The Court: Well, in any event, he was not bound by what he might or might not think of that matter; that was a matter for him entirely.

Mr. Wittschen: By the same token—

Mr. Marrin: It is a matter for the plaintiff, yes; but I think it is up to the plaintiff to show that the method adopted was reasonable, in view of all the circumstances.

The Court: He already testified it was, without indicating what end of the tunnel he might or might not be working on. However, I will allow you a record on it; but I must indicate to both sides that I am going to be severe on my rulings, or we will be here until the rains fall again.

Mr. Wittschen: Note an exception.

The Witness: Will you read the question, please?

(Pending question read by the reporter.)

The Witness: A. Yes; I considered it was a very proper method of driving it. In all short tunnels, wherever—There are only two reasons for driving a tunnel from both ends: one of them is the limit of time; and the other is distribution of material. In this instance, if the tunnel had been—or, if the material had been [1574] as represented, there was plenty and ample time to drive the tunnel from the west end.

Mr. Wittschen: Pardon me. I ask that the part, "if the material had been as represented," go out.

The Court: It may go out.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Q. Have you stated all your reasons, Mr. Hindmarsh?

A. No; first, the distribution of material: in this case, they figured the only place to deposit it was on the west end of the tunnel; there were a few places on the east end that possibly it could have been hauled to,—but a long-distance, expensive haul, to dispose of it on the east end. The logical place was the west end; and, if you are figuring on driving from both ends, it would be a duplication of very heavy, expensive equipment, which naturally would have raised the Contractor's price, if he intended to do it.

The Court: Q. Well, the main fact there would be economy, wouldn't it?

A. Yes, very much economy.

Mr. Marrin: Q. Mr. Hindmarsh, of what does the timber in a tunnel consist?

A. The main timber in a tunnel is the posts and segments, which are generally, as a rule, 12 by 12. This is lagged with, as a rule, from 3 by 3's to 3 by 12's, all around the perimeter of the tunnel wherever it is necessary. That is also the case except in places where there is liable to be considerable spiling and your crown bars above your rings.

Q. What part of the timbering consists of the lagging, in percentage?

Mr. Wittschen: Objected to as immaterial and too vague and indefinite. I take it, some tunnels

(Testimony of Victor G. Hindmarsh.)

are lagged entirely, and some are not lagged at all; and you cannot say, unless you know the exact case. The term "timbering" is defined in the specifications, in any event.

Mr. Marrin: Q. What part of the timbering in the Broadway Tunnel would be lagging, Mr. Hindmarsh? [1575]

A. Well, I would say about 40 per cent.

Q. In ground which is not self-supporting, can the lagging be removed? A. No.

Q. In ground which is not self-supporting, is it good practice to remove any of the timbering?

A. No; it is not good practice. In the last 20 or 25 years, there are very few engineers who will allow you—

Mr. Wittschen: I submit the question has been answered, and that is a voluntary statement.

Mr. Marrin: Q. In your experience during the last 20 years, have engineers, generally, permitted the timbers to be removed from tunnels in which the ground is not self-supporting?

Mr. Wittschen: Objected to as immaterial, and calling for an opinion and conclusion of the witness upon a matter which is not in issue in this case. What is done in other tunnels is not a criterion for what should be done here,—what other engineers do; and I am prepared to submit to your Honor a line of authorities excluding all this line of testimony, if your Honor cares for it.

(Testimony of Victor G. Hindmarsh.)

The Court: On what theory is the removal or necessity for removal of the timber here—how does that bear upon the issue?

Mr. Marrin: Well, if the Court please, in these specifications—

The Court: I have in mind, under the plans and specifications.

Mr. Marrin: Yes. Under the plans and specifications, it stated that the general intent of the specifications was that the timbers shall be entirely removed. Upon the cross examination of Mr. Larson and some of the other witnesses, the defendants themselves have gone extensively into the question of whether the timber was removed from other tunnels,—for instance, the Hollywood Tunnel and the Bayshore Tunnel.

The Court: That has no relation to the issue here. Here, [1576] the Engineer permits some of the timbers to remain; under the plans and specifications, he could have designated that that be removed.

Mr. Marrin: He could have, yes.

The Court: If I am in error about that, correct me.

Mr. Wittschen: He not only could have, but the testimony is they could have left it, or taken it all out, or they could have evolved a different method of driving the tunnel, and leaving the core in, and stulling against it.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: I think the testimony goes to show what might be reasonable practice, from experience in the contracting industry, on reading the specifications.

The Court: Have you indicated, for the purpose of the record, the purpose of the offer? I have in mind the issues in this case.

Mr. Marrin: The purpose of the offer, if the Court please, is to show that, where ground is not self-supporting, the timber is not usually permitted to be removed; and these specifications provide for its removal. It shows they indicate that the ground would be self-supporting.

Mr. Wittschen: Mr. Larson gave his direct testimony on the Bayshore Tunnel, and testified in that Tunnel No. 3 they took all the timbers out. He was asked if it was self-supporting, and he said "No." Then, on redirect examination, he was asked if that were done in this tunnel,—could it have been done? Yes. How much more would it cost? A million dollars more, was his answer. Now, what they do in other tunnels and what their conclusions are, as to what would have happened in other tunnels, is entirely immaterial here. These specifications are neither ambiguous nor uncertain. They state it is the general intent that timbers shall be removed; if it is impracticable to remove them, they shall remain in, or, wherever practicable, they should remain in.

(Testimony of Victor G. Hindmarsh.)

The Court: The Court has allowed considerable latitude in [1577] this case, and the reason I did it was: when you outlined your case at the beginning, you indicated that time was of the essence here, and that was the issue as it appeared. For that reason, I allowed considerable latitude on both sides, but finally this case must be determined from the plans and specifications, and no matter what may or may not have occurred in other ground, or in other tunnels, will not finally determine the issues in this case.

Mr. Marrin: I appreciate that, your Honor; but I think the plans and specifications, when they are drawn and presented to the contractors, a contractor would be entitled to read them, in the light of the general practice in the construction industry; and that is the point at issue, if your Honor please.

Mr. Wittschen: That would be changing the contract by parole evidence.

The Court: In any event, the Court cannot make another contract in this case, and has no thought of making another contract. I try to point these matters out, now, so I will not lull either side into security as to what I may or may not do. I am trying to give you a proper record here; so, if I am in error, either side will have the record to comfort them. That is one reason why, if I am in doubt about any testimony, I will allow it to come in. Now, if you want to submit the matter, I will rule.

Mr. Wittschen: I will submit it.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: Surely.

The Court: Read the question.

(Pending question read by the reporter.)

The Court: Objection will be sustained.

Mr. Marrin: Note an exception, please.

Mr. Alexander: We join in the exception, your Honor.

Mr. Marrin: Q. Mr. Hindmarsh, you have heard all the testimony [1578] in this case up to date, have you not? A. Yes.

Q. Would you state whether, in your opinion. the Contractor, the plaintiff in this case, was delayed in the construction work, by reasons beyond its control?

Mr. Wittschen: Objected to as asking the witness to weigh the testimony, and not a proper hypothetical question, and immaterial, because that is a matter for the Court to determine, in any event; so, therefore, to the objection we add it invades the province of the Court.

Mr. Marrin: If your Honor please, this witness is familiar with all the testimony, and also is familiar with the work which was done, and the conditions of work; I think he is entitled to express an opinion on that subject.

The Court: He has already testified as to every detail, as the other witnesses have. From that record, the Court must finally try to determine that issue, after you determine all the facts in relation to any delay, if a delay occurred, through the acts

(Testimony of Victor G. Hindmarsh.)

that you may or may not have had control of. You have got a record on that; and I must determine, from that record, finally, an answer to the question that you addressed to this witness.

Mr. Marrin: I appreciate that, in the end, your Honor, you are the one who has to express an opinion.

The Court: I can anticipate the answer of the witness on the stand. The objection will have to be sustained.

Mr. Marrin: Note an exception.

Mr. Alexander: We also except, your Honor.

Mr. Marrin: You may cross examine. [1579]

Cross Examination

Mr. Tinning: Q. When you set the timbers in the portions of the tunnel which you excavated how much clearance did you allow on the plumb posts at the side of the tunnel?

A. 3 inches minimum.

Q. 3 inches? A. A minimum of 3 inches.

Q. A minimum of 3 inches? A. Yes.

Q. Was that at the top and bottom?

A. Yes, that was top and bottom.

Q. Was your wall plate also set 3 inches in the clear?

A. Yes, it was set 3 inches in the clear.

Q. That applied to all work? A. Yes.

Q. The segment above the wall plate, that was also set clear 3 inches?

A. That was set 3 inches in the clear.

(Testimony of Victor G. Hindmarsh.)

Q. Isn't it true, Mr. Hindmarsh, when you drove the tunnel and you found that the ground appeared to be moving, that you frequently set the crown or top timber at the top as much as 9 inches in the clear? A. That is right.

Q. All of the segments of the various sizes, for instance, all A segments, B segments, and C segments were of the same size, were they not?

A. 12 by 12, you mean?

Q. The same length, they were all cut out in the lumber yard, were they not?

A. No, there were individual sets set; when it was necessary there were no segments cut.

Q. Isn't it true that most of the segments were brought in cut to size? A. Yes, most of them.

Q. When you set your segments 9 inches at the top isn't it true that you used the same pieces and simply shortened up the curve on the wall plate?

A. No.

Q. Did you cut extra sets?

A. We cut extra sets, many times.

Q. The timber diagram, Plaintiff's Exhibit 79 for one tunnel, and [1580] Plaintiff's Exhibit 80 for the other, apparently commenced at a station somewhere above where—that is east of where the slide actually occurred on August 28, 1935? You know what I am referring to?

Mr. Marrin: You mean the timber survey?

Mr. Tinning: Yes. A. Yes.

(Testimony of Victor G. Hindmarsh.)

Q. Do you remember where you started that survey or the portions of the north tunnel that you surveyed—would you like to look at this—I think we can find them there so big.

A. We started just about the slide, the cave-in.

Q. The cave-in was at 114?

A. 114, and extended to about 114+96.

Q. Close to 115+00? A. Yes.

Q. You went on with that survey up to about the point that I am indicating here, did you not, about 122? A. 122.

Q. It is true, is it not, that there had been movement in the timbers west toward the portal of the west tunnel before you made the survey?

A. I believe right there in the cave-in there had been movement.

Q. The cave occurred while the workmen were setting back timbers, at that point where the cave occurred?

Mr. Marrin: Now, Mr. Tinning, he did not testify to that. This witness testified he did not come onto the work until after that.

Mr. Tinning: Is there any question about the fact?

Mr. Marrin: No, there is not any question about the fact, but this witness is not the proper witness to ask that question, because he does not know the fact.

(Testimony of Victor G. Hindmarsh.)

Mr. Tinning: Q. You know the timbers were reset there, don't you?

A. I don't know what happened there, at all.

[1581]

Q. You have not been over the records?

A. I do not think that our record shows that the timbers were reset; there are none that I have seen.

Q. But you do know that there had been some movement because you have already told me.

A. Yes, I knew they were working; I understood they were working there at the time on the timbers when they caved in. That is all I know.

Q. In the south tunnel is it likewise true that there had been some movement of the timbers west of the point where your survey commenced?

A. That I don't know, whether there was any movement, at all, there or not.

Q. You do know, however, that it was possible to put the concrete lining into the westerly portion of the south tunnel without resetting any substantial amount of timbers; you went right through there after the slide, didn't you, up to the adit?

A. You mean in the north tunnel?

Q. In the south tunnel.

A. In the south tunnel, yes, we went very close to the adit with the concrete.

Q. And the adit is the first adit as you enter the tunnel, the most westerly of the three in the completed structure, located at the place where the

(Testimony of Victor G. Hindmarsh.)

Wildcat fault is indicated on Dr. Louderback's report? A. Approximately that.

Q. In that area? A. Yes.

Q. And was the modified section installed from the adit on up to station 122? A. Yes, it was.

Q. So that there was pressure in the north tunnel along through that area on the righ-hand side of the tunnel, that would be the south side of the north tunnel? A. On both sides.

Q. On both sides? A. Yes.

Q. The timber diagram will show at the time the measurements were [1582] made the extent to which timbers had intruded into the section that you have just referred? A. Yes, they would.

Q. And likewise would show where intrusions occurred in the south tunnel?

A. That is right.

Q. How much closer up to the excavated face of the tunnel while you were driving it did you keep your concrete than when Mr. Price was on the job?

A. When I caught up with the concreting I tried to keep it up to 125 feet, or close thereto.

Q. When you came to the tunnels there were several hundred feet of unlined excavated tunnel there? A. That is right.

Q. Now, that square setting which you used in preventing the movement of timbers and holding the tunnel is not a novel method of holding timbers that are moving, or moving ground, is it?

(Testimony of Victor G. Hindmarsh.)

A. No.

Q. It is a usual method?

A. It is the usual method.

Q. And it is true, is it not, that square sets such as you used provided very much stronger support in a long tunnel arch than is provided by the ordinary timber that was used in this tunnel?

A. That is true.

Q. The wood forms which were built in this tunnel in the square-setted sections were normal forms for the type of construction you had to do where you had a square set?

A. Yes, I built many of them.

Q. When you started the excavation of these tunnels, yourself, after you caught up with the concrete and started driving, how long were the drill holes that you used in the core, on the average?

A. That depends on what part of the core you are talking about that varied all the way from 6 feet to 12 feet.

Q. Let us start with the longest ones. What part of the core were those in?

A. They were in the lifters, in the center of the core.

Q. At the ground level? A. That is right.

[1583]

Q. Where were the 6-foot holes?

A. Along the edges.

Q. Near the timbers?

(Testimony of Victor G. Hindmarsh.)

A. Yes, under the wall plate.

Q. Did you run about the same length of the drill holes used as you continued the driving?

A. Yes, that was practically the practice right straight through.

Q. It was about the same all the way through?

A. Yes.

Q. How many drill holes did you have in the face of the tunnel, in general average practice, as you went up the core?

A. That varied very much, that I don't know; sometimes we would shoot the core with three or four holes, and other times it would take ten or fifteen of those holes right in the center of the core. It all depends on the formation of the ground, how hard it was; some did not need any powder at all; the shovel took it out without any powder.

Q. In other places you had to drill these holes 12 feet long? A. Yes.

Q. Did you ever run into as many as 40 holes in the space of one blast?

A. We might have, yes. I would not doubt that we had.

Q. When you had a 12-foot hole how many sticks of powder did you have in it?

A. Well, that varied; it varied with the ground; I don't know just how many sticks of powder we had in each hole, because each hole was different.

Q. I understand that there was varying material,

(Testimony of Victor G. Hindmarsh.)

but when you had a 12-foot hole what was the minimum amount?

A. The length of the hole did not mean anything about how much powder you put in it; you might put as much powder in a 6-foot hole as you would in a 12-foot hole.

Q. What was the minimum you would put in a hole? A. 4 or 5 sticks.

Q. A stick weighed about half a pound?

A. I think it takes three sticks, as I remember it, for a pound of powder.

Q. What would be the most powder you put in one of these drill holes?

A. Well, it averaged about three-quarters of a pound [1584] to a yard; I think you could get it easier that way.

Q. You cannot tell me how many pounds you put in a given drill hole, as a maximum?

A. No; I don't know of any hole that I took the exact amount and found out how much powder was in there.

Q. I think there was approximately 35.6 yards of earth in each lineal foot in a section. Does that conform to your memory of the situation?

A. That was the full tunnel face, yes.

Q. And the overbreak was six or seven yards more, was it not? A. Yes.

Q. So that if you used three-quarters of a pound per yard you would have used about how many pounds to each lineal foot?

(Testimony of Victor G. Hindmarsh.)

A. You would have three-quarters of 45, whatever that is.

Q. It would be somewhere around 33 pounds?

A. Yes.

Q. So that if you used 12-foot drill holes you would have twelve times as much powder as that?

A. Well, no, that was scattered in a good many places, not only in the core; the drift was all shot separate on both sides of the tunnel, the wall plate drift, and the rings were all shot separate, and the core was shot separate.

Q. Do you mean at separate times?

A. At separate times, yes.

Q. Do I understand then when you were shooting up one of these drifts ahead that firing was done at a different time than the firing in the face?

A. Oh, yes, lots of the time, most of the time.

Q. Sometimes they were all fired together, were they not?

A. Well, they might be.

Q. It was not the practice, though, to fire them at once? A. No, it was not.

Q. Isn't it a fact that as you progressed with the work, Mr. Hindmarsh, that you began to shoot more heavily than you had when you started?

A. No, I don't think that is the case. [1585]

Q. Did you receive a letter from Mr. Boggs on January 30, 1936, with respect to heavy shooting?

A. Yes, I remember receiving a letter.

Mr. Tinning: If your Honor please, we offer in

(Testimony of Victor G. Hindmarsh.)

evidence a letter dated January 30, 1936, addressed to Six Companies of California, Berkeley Office, a copy of which went to Six Companies, 155 Sansome St., San Francisco. Is that the copy?

A. Yes, that is a copy.

Q. Is it the letter that you received?

A. Yes.

Mr. Tinning: We offer it in evidence as Defendant's Exhibit in proper order.

(The letter was marked "Defendant's Exhibit I-4.")

Mr. Tinning: It reads as follows:

DEFENDANT'S EXHIBIT I-4

January 30, 1936

File: Broadway Tunnel
Blasting

Six Companies of California,
P. O. Box 120,
Berkeley, California.

Gentlemen:

On January 28, 1936, at about 11.00 A.M., very heavy blasting was done in the Downgrade Tunnel.

The District Engineer was standing in the West Portal Building more than one-quarter of a mile from the location of the blasting and noted extremely heavy shocks and vibration resulting from the shooting.

Your attention is directed to provisions of

(Testimony of Victor G. Hindmarsh.)

the Specifications with respect to the use of explosives, and you are advised that you will be held responsible for any damage occurring to the building or tunnel lining, or other structures, which may result from your blasting operations.

Very truly yours,
(Signed) Wallace B. Boggs
District Engineer

WBB/VE
CC to Six Companies of California, 155 Sansome St., S. F.

[Endorsed]: U. S. Dist. Ct. M. D. Cal. No. 20101-R. Deft's Ex. No. I-4. Filed May 5, 1938. Walter B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

Q. The downgrade tunnel was the north tunnel?

A. Yes. [1586]

Q. Following your receipt of that letter, Mr. Hindmarsh, did you diminish the charges of powder that you were using at a given time?

A. No, I did not.

Q. You proceeded about the same way?

A. About the same way.

Q. Driving forward and making the best time you could with the excavation?

A. Yes, that is what I was there for.

Q. Do you remember that on February 4, 1936, a heavy shot was fired in the left wall plate drift in the north tunnel at station 126+35, which broke the

(Testimony of Victor G. Hindmarsh.)

ground ahead from station 126+35 to 126+43—that would be a distance of 8 feet—in the left wall plate drift of the north tunnel, that would be the north drift of the north tunnel. Do you recall that incident, at which time all of the timbers in seven sets back of the drift face, that is, from station 126+35 back to station 125+92, a distance of 43 feet, were blown out of the drift? A. No, I do not.

Q. You don't recall that? A. No, I do not.

Q. You would not say it did not happen?

A. I do not think it happened.

Q. You do not think it happened?

A. No, I do not.

Q. And that later on the same day, or February 4, while clearing up the wreckage of this thing the mucking machine pulled out three more sets back of 125+92?

A. The mucking machine pulled out some sets, this Bagley pulled out some sets.

Q. Did the hill fall in on you then?

A. No.

Q. Do you remember that the day following, on February 5, 1936, when the core was shot at station 125+12 in the north tunnel, two complete rings were shot out, including the segments and the spreaders at station 124+94, that is 20 feet back from where the shot was fired?

A. Yes, I remember that. That is nothing unusual in any tunnel. [1587]

(Testimony of Victor G. Hindmarsh.)

Q. The ground was sufficiently good there that you never put these sets back, did you?

A. That is right.

Q. Defendant's Exhibit H, which is in evidence here, shows these rings that you shot out? I will show you Defendant's Exhibit H. Your Honor has already seen this exhibit, which is the one looking up at the ceiling of the tunnel. Does that represent the condition as it was?

A. That is right. The lagging was clear across the roof, so it protected the roof from caving; there was no danger there as long as the concrete was coming in close by.

Q. And that was the reason it was left standing in that position? A. Yes.

Q. Now, Mr. Hindmarsh, a few days later, and on February 6th, do you remember that in the left wall plate drift at station 126+50 to station 126+56 a shot was fired and that nine sets in that drift were shot out, all of the timbers in nine sets in that drift were shot out back to station 125 plus 82?

A. No.

Q. You don't remember that? A. No.

Q. Would you say that it did not occur?

A. Yes.

Q. Do you remember that on February 15, 1936, in the down-grade tunnel between station 126 and 126+10 a run occurred under the left wall plate that started at midnight and was stopped at 4 a.m.,

(Testimony of Victor G. Hindmarsh.)

with a power shovel? Do you remember that incident?

A. Why, we had that on several occasions; we had several small runs that were stopped; I don't remember that.

The Court: What do you mean by small runs?

A. Well, material right back of the timber would start coming down. This happens most any place in the tunnel where the ground is broken.

Q. Running material?

A. Running material in behind the timber, and sometimes you have to put in some more lagging to keep it from running. That is not unusual in any tunnel.

Mr. Tinning: Q. And that at the place where the run occurred [1588] there was 15 feet of unsupported wall plate between the post that was nearest to the core in the wall plate drift. Do you remember that condition?

A. Well, that might have happened. I know on several occasions we had 15 feet of wall plate unsupported.

Q. You did not consider that that was treading close to danger to have 15 feet of wall plate not supporting those rings that are holding up the roof?

A. That depends on the condition where you are. That is a common thing to let a 14-inch wall plate stand that distance.

(Testimony of Victor G. Hindmarsh.)

Q. When that wall plate is sagging down two inches in the middle of the span won't it loosen up the rings above?

A. If it sags down, but that is not unusual. It might sag before it ever came in the core at all.

Q. If it sags that way it loosens the rings above?

A. That is true, if they are not tightened up.

Q. And the rings are supporting the roof in unsupported ground?

A. Yes, but these segments lots of times with the wall plate will settle, because in our drift the ground, as you know, was soft, and when we put these wall plates in on mud sills, if any load comes on it, as a rule, these wall plates at times may sag, but that was all caught up before it ever came off the wall plate drift, and the segments retightened.

Q. I am talking now about a condition where you have 15 feet of wall plate that is unsupported between the posts, the last plumb post or batter post, and the place where it is supported on the ground in the wall plate drift, if you have a sag of two inches there won't that loosen it?

A. That depends on where it sags. It might have been in that condition before it ever got out of the wall plate drift.

Q. In other words, it was a warping of the timber and it had all been taken care of by bracing?

A. Yes. [1589]

Q. And checking in such a way you had a stable condition? A. That is right.

(Testimony of Victor G. Hindmarsh.)

Q. But if it sagged, after you had taken the support out from underneath the wall plate it would follow that the rings above were not supporting the roof at that place, wouldn't it?

A. No, that does not always follow, because if you have got heavy ground there enough to sag your wall plate your roof will follow the timbers, the timbers will be sticking up the side and your timbers set.

Q. If you have not gauged it right it may come right down and follow down to the bottom of the tunnel?

A. That is possible in any tunnel.

Q. Mr. Hindmarsh, this is a diagram made from the records of the District of the locations of all of the timbers in the north tunnel from station 122, where you started your driving, through to the place that Six Companies ceased doing work on the 13th of June, 1936, and shows on the bottom the posts on the south side of the tunnel and on the top the posts on the north side of the tunnel, the left side, and in the center space between the wall plates or between the caps where you did not have a continuous wall plate; it shows the segments. Does that appear to represent to you the locations of the timbers in the portions of the tunnel that are referred to, as you remember them?

A. Yes, it looks something like it; I guess it is approximately what it was. It is pretty hard for me to tell, just looking at that diagram, at that particular station you state it was.

(Testimony of Victor G. Hindmarsh.)

Q. Well, do you remember this timbering that we were discussing, that was shot out at 124+90 a little while ago?

A. If that is the station I don't know.

Q. The station appears.

A. I don't know what your diagram shows [1590] there, what it is.

Q. What do you mean?

A. I don't know if that is the place that the timber was shot out, or not.

Q. You can see station 124+90? A. Yes.

Q. I asked you a short time ago if it was not a fact that the timber was shot out of there, and you said you didn't know.

A. What I meant by that is I didn't know the exact station. I know there was some shot out, but I don't know the station.

Q. You did not see any other timbers shot out in that tunnel that was not replaced? A. No.

Q. You said this morning with respect to a letter from the Industrial Accident Commission and a diagram that was sent, that you had difficulty about your batter posts. You use batter posts frequently, don't you? A. Yes.

Q. And you use those to advance ahead under the wall plate as you drive ahead to get support as far ahead as you can? A. That is right.

Mr. Marrin: Pardon me. I think you misquoted the witness' testimony. I do not recall his testifying he had any difficulty about the batter posts.

(Testimony of Victor G. Hindmarsh.)

Mr. Wittschen: He said the Industrial Accident Commission suggested that batter posts go in, and he indicated it was a novel method. We might have misunderstood him.

A. You must have misunderstood me. I did not intend to say that.

Mr. Tinning: Q. You have used batter posts?

A. Yes.

Q. You used them during a good part of the work that you did in the north tunnel?

A. That is right.

Q. You used them for the purpose of getting support under the wall plates as far ahead as you could, so that when your wall plate was in the drift you could get a space between that and the next vertical [1591] post support as near as you could to take care of the weight of the timbers that ran from the roof of the tunnel? A. Yes.

Mr. Marrin: Identify the document. That is not in evidence yet.

Mr. Tinning: I wanted to see if he recognized what it was, and then I propose to offer it in evidence.

Mr. Marrin: You may mark it for identification, or you may put it in subject to check.

Mr. Tinning: It is made from our records and I think it is correct.

Mr. Marrin: Is that to scale?

Mr. Tinning: Yes.

(The diagram was marked "Defendant's Exhibit J-4.")

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: We do not admit the accuracy of it.

Mr. Tinning: No. It is formed the same as your timber record.

Q. Now, referring to this timber diagram, Defendant's Exhibit J-4, I will ask you, Mr. Hindmarsh, to examine the portion between stations 126 and 127, which is the area where your slide of February 22, 1936, occurred. I believe you stated that that slide, as you remembered it, occurred at 126+50. A. I think that is right.

Q. In making that statement are you sure of that, or is that your best recollection?

A. No, I am not sure of it. That is my recollection, as I remember, of the station it was at that time. It might have been one way or the other.

Q. It might have been 25 or 30 feet either way?

A. Yes.

Q. Was the ground, as you approached the place where this cave-in occurred, increasingly better, or was it getting worse?

A. Well, it varied all the way through, the ground generally, most every round; the condition of the ground you could not predict at any time, what it was going to be. [1592]

Q. You notice on this diagram it shows that you had your plumb posts and batter posts closer together around station 124 than you had when you got up near station 127, where this slide occurred.

A. Well, there were ample posts under there at any time to hold anything that the wall plate could stand. It would have held with half that many.

(Testimony of Victor G. Hindmarsh.)

Q. If you had half that many as you actually installed there you could have held that wall plate?

A. It would have crushed the wall plate before it would break the posts.

Q. For that reason you were able to put two and three timbers over the ring at the top of the tunnel, on top of the wall plate, and then support the wall plate?

A. That is right. The reason for two or three timbers above the wall plate was due to the shape of the rings. You could hardly get any strength in that design, where it was so flat on the sides, and your posts took more of a down weight.

Q. When you got up to station 126+50 or 126+75, according to this gland or kidney that you referred to, as I understand it that was what you would call an intrusion, was it not, of some other material? A. Yes.

Q. Into the cherts? A. Yes.

Q. I think you said on one side of the tunnel as you passed through you passed through a lens of this material that was only two, or three or four inches thick, I don't remember what.

A. On the north side of the tunnel.

Q. On the north side of the tunnel. That would be on this diagram there?

A. Yes, as I remember it.

Q. And on the south side it was a couple of feet thick? A. Yes.

Q. It went through at an angle? A. Yes.

(Testimony of Victor G. Hindmarsh.)

Q. Is that correct? A. Yes.

Q. Something about like this, was it?

A. It followed along the [1593] tunnel on an angle, probably 30° slope, or something like that; it ran along the tunnel.

Q. Were the two places where you had the two inches wide and two feet on the other about opposite each other at the floor of the tunnel?

A. No, it was further along in the tunnel; it followed that lens quite a little ways in the tunnel, in the bench, before it went out of the tunnel.

Q. But where you crossed it at that time was the ground on the north side, was that nearer the west portal than the south side was?

A. As I remember it was.

Q. So that the general trend of this would be something of an angle like I am pointing here; I suppose that is a 25 or 30 degree angle, is it not?

A. I suppose so.

Q. It also tipped back so that the tip of it—I don't know which way it tipped—what do you know about it? A. It ran easterly.

Q. That is, the top was farther away than it was to the ground? A. Yes.

Q. And do you remember how high the lens was or how wide the lens was at the top of the tunnel in the center?

A. I don't remember the lens showing at the top of the tunnel; it may have, but I don't remember it.

Q. You would not say that it did not show?

(Testimony of Victor G. Hindmarsh.)

A. No, I would not say so.

Q. And after it caved in you found some material that you had seen in these veins as you passed through the formation, you found a piece of that, I think you said you left some boulders up in there?

A. Yes, that followed up higher in the tunnel, 40 or 50 feet. [1594]

Q. Was there anything about that material, as you went through, that suggested to you that you should take different steps to support that than you had at some other part?

A. No; not particularly. In fact, I had had just as bad, if not worse, ground further back in the tunnel where I had stopped the progress at the face of the tunnel for a week, while I concreted it, because the posts were moving. The posts were not moving as rapidly at this section as they were further back.

Q. But there was some moving here?

A. There was always movement in all the posts.

Q. The material you found there did not cause you to change your method of timbering or your method of holding the ground at that point, in any respect?

A. We put in some, I believe, 14 by 14's in the ring there,—stiffened those up a little.

Q. Made them larger?

A. Made them larger; made them larger than what we had been using.

Q. That is, to support the roof where this material lay? A. Yes.

(Testimony of Victor G. Hindmarsh.)

Q. You cannot say now what width this kidney had in the roof?

A. No; I could not tell you.

Q. Mr. Hindmarsh, I am going to ask you to look at these two diagrams. The one I am pointing to now is a diagram of the right portion of the tunnel,—the right side of the tunnel,—showing from the center line of the portion of the tunnel on the right-hand side from Station 126+50 to Station 127+75, showing the heading of the drift as it was on February 21, 1936; and the other diagram showing the other side of the tunnel,—similar diagram. If these two diagrams were taken and folded over a glass tube—

A. I understand.

Q. I am trying to explain this to the Court— If these two diagrams were taken and folded over a glass, so the edges came together, the top of the drawing of the tunnel would represent the entire [1595] interior of the tunnel, showing the timbers in the tunnel, and the other matters that are shown.

The Court: What is this side?

Mr. Tinning: That is the north side of the tunnel, coming up this way; the north side; and this is the right side, or south side, going up the tunnel.

Q. Mr. Hindmarsh, this diagram is made from the District's notes and measurements of timber taken to 7 a. m. on February 21st; and the man who made the measurement was in the tunnel at 3

(Testimony of Victor G. Hindmarsh.)

o'clock that afternoon, and that was apparently about 5 or 6 hours before you left the tunnel; I think you said you left about 8 or 9 that night?

A. Yes.

Q. Would you look at the diagram, and see whether,—referring now to the right-hand side—whether it appears to represent the location of the plumb post, with respect to the core face, as you remember it, at the time you last saw it?

A. Yes, it is probably approximately correct, so far as I can see now—nothing unusual about it.

Q. There is nothing unusual at all, you say? And, likewise, is that true of the left-hand side?

A. Yes, I believe so.

Q. That would be the north side of the tunnel?

Mr. Marrin: May I ask, Mr. Tinning: Was this blueprint made on the date it appears to have been made there,—February 21, 1936?

Mr. Tinning: No; it is the timber location. This has just been made from our notes, for demonstrative purposes and for this testimony, and for no other purposes; but the data that is on there, except as it appears upon some other date—for instance, there is "Approximate surfaces of the muck pile": that was put on,—the data from the morning of the 22nd; but the timbers are as they stood the last time it was measured by the District before the slide. They were measured on the morning of the 21st of February, at 7 a. m. [1596]

(Testimony of Victor G. Hindmarsh.)

Mr. Smith: The face of that core is an estimated position, is it?

Mr. Tinning: Yes. In other words, the face is taken from the measurement, and the bottom is run down, in about the same manner as the other cores that are actually put on there.

The orange line, which is marked "Core 7 a. m. February 19," indicates the line of the core at the time stated, on the 19th of February. The yellow line, which is next easterly, represents the core at 7 a. m. on the following day, February 20th; and the red line most easterly represents the position of the core as measured at 7 a. m. on February 21st; and these are all centers.

The Witness: They were approximate stations, also.

Mr. Tinning: Yes; taken in the tunnel as approximations; and this diagram shows that, at the time this measurement was taken, or after this measurement was taken, there was further excavation on the right-hand side of that tunnel, was there not, from the point where the core was, on the morning of the 21st, and where it was estimated to be on the morning of the 22nd? A. Yes.

Q. These dotted lines, which appear on the diagram, running from the floor line to the top, are the lines taken by the man who measured this—at which he saw the boundaries of the lens; and you will notice that it was marked at 126+85, and is leaving the tunnel at the top, 126+54, on the west-

(Testimony of Victor G. Hindmarsh.)

erly end, and toward the east at 126+71. Does that represent the conditions, or does that refresh your recollection as to the conditions, with respect to the position of the lens of material that you have referred to?

A. No; I don't think the lens runs that way. It did not extend so far in the crown. My remembrance of the lens was it went practically outside the tunnel at this point; and there was a long distance right here, where it caved in, that there was no sign of any of this muck. It may have come back up into the roof; I am not sure. [1597]

Q. Well, Mr. Hindmarsh, I am calling your attention, to get "this" into the record—you pointed to the area above the wall plate? A. Yes.

Q. You stated, as you recollected, the material you could discern had disappeared in the roof of the tunnel above the wall plate?

A. The material on the side. Like in here: it may have come out again in the roof; I am not sure. I did not notice whether it was up there in the roof or not; whether it was or not, I cannot definitely say.

Q. At any rate, it is your testimony that, above the wall plate and for some distance on the side of the tunnel, you believe it disappeared?

A. Yes.

Q. You could not see it; it was not visible? Now, on the other side of the tunnel,—the left-hand side, or the north side, of the tunnel—also, we have

(Testimony of Victor G. Hindmarsh.)

indicated by dotted lines, in the same manner, the lens of material which intersects the floor at about 125+97 or 98—was that about a fair estimation?

A. One hundred what?

Q. 125 plus— A. 125 or 127.

Q. Then I have made a mistake on that, because it is 126-plus about 48. A. Yes.

Q. 126+48.

A. I don't know what the scale is on that map.

Q. Past the most easterly portion of the lens, as shown on the map,—that was 126+71; and the most easterly portion of the top of the tunnel was 126+54. Would you say that those dotted lines are reasonably accurate representations of the appearance of that material on the north wall of the tunnel?

A. Yes, if it showed up there on the north wall of the tunnel at all, except down in—right in here on the bench,—this point here,—it went diagonally across.

Q. What do you mean by "the bench"?

A. This is the bench here.

Q. You mean where the plumb posts are below the wall plate?

A. Yes. As I remember, it started about there, —a very small lens,— [1598] and went directly across the face of the tunnel on about an angle, I would say, of 30 degrees.

Q. Well, it shows here at 126+48 on the north side, and 126+ about 80—isn't it? A. Yes.

(Testimony of Victor G. Hindmarsh.)

Q. That would be about 32 feet, wouldn't it?

A. More than that— Yes, that is right.

Q. About 32 feet?

A. A 45-degree angle, practically.

Q. About a 45-degree angle. So, the south side of that lens would be about 32 feet further toward the east end of the tunnel than the north side?

A. Yes.

Q. But you, again, are unable to recollect that there was anything that you could discern above the wall plate?

A. There was nothing there to indicate any trouble at all, that I remember of, on that side; it was very hard.

The Court: We will take a recess for a few minutes.

(Recess)

Mr. Tinning: If the Court please, we will offer in evidence, as Defendant's Exhibit K-4, the diagram which we have been using in discussing this matter with Mr. Hindmarsh, as being the right-hand side of the tunnel, and also as L-4, the diagram of the left side of the tunnel.

Mr. Marrin: Those will go in, of course, subject to our check?

Mr. Tinning: Subject to your check.

(The diagrams were marked, respectively, "Defendant's Exhibits K-4 and L-4.")

Mr. Tinning: Q. Mr. Hindmarsh, in order that we may understand exactly what this diagram is

(Testimony of Victor G. Hindmarsh.)

attempting to elucidate, I would like to show you what I have done here during the recess. I have drawn, on a piece of flat paper, something similar showing one of these dotted lines, — what these dotted lines show.

The Court: Isn't there a photograph here, showing that? [1599]

Mr. Marrin: Yes.

Mr. Tinning: Yes, your Honor. What I am trying to do with this— If turned over like this, we have one side of the tunnel; and the top line of the tunnel is the center line. If we put those two together, we would have, what I am showing here—

Q. That is a fair representation of what these two diagrams would do, if joined together in that manner, isn't it, Mr. Hindmarsh?

A. That would be probably what it indicates.

Q. Yes. Now, the photographs that your Honor spoke of are here, ready, as the next matter to be taken up.

I show you a photograph, looking west of Station 127+08.

The Court: Would that be looking down the tunnel?

Mr. Tinning: Yes, that would be looking down the tunnel.

Q. That was a photograph taken some time after the slide, and shows some of the intrusive material to which you have referred, does it not, Mr. Hindmarsh?

(Testimony of Victor G. Hindmarsh.)

A. I think it is—the white material is down here.

Q. Yes; and shows the cherts at the top of the tunnel,—one edge of this slide,—does it not?

A. As I view this photograph, I think it shows the easterly end of the cave-in. Is that right?

Q. Yes, I think so.

The Court: Pardon me. This is off the record.

(Discussion, off record.)

The Witness: That was taken some time after the slide.

Mr. Tinning: Q. At the time that you were getting ready to remove this material? A. Yes.

Q. After you had caught up your concrete wall? The point of the photograph, if the Court please, is that it shows the white lens of material in the roof of the tunnel.

The Witness: On the left-hand side.

Mr. Tinning: Q. Yes. Now, I will show you a photograph taken [1600] on the same day; and ask you if you are able to say where that was taken, Mr. Hindmarsh. It was taken on April 8, 1936.

A. It looks like it was taken practically from the same place. What is the date?

Q. April 8, 1936. It shows the space, does it not, in between the top of the slide and the roof, at that point?

A. Well, it shows— This is taken where this measurement is being shown—that is on the slope of the slide.

Q. Yes; the easterly slope of the slide?

(Testimony of Victor G. Hindmarsh.)

A. Yes.

The Court: They are identical, aren't they, only from the point taken?

The Witness: It looks to me as though they are taken at practically the same spot.

Mr. Tinning: The purpose of the measurement was to get distance, your Honor. We offer these two photographs, taken on April 8th, of the slide area at Station 126+95, as defendant's exhibit next in order. I think it is "M4-1 and 2."

Mr. Marrin: Which one is No. 1?

Mr. Tinning: The one without the measuring rod.

(The two photographs were marked, respectively, "Defendant's Exhibits M4-1 and M4-2.")

[Set out at pages 467 and 468 of the Book of Exhibits.]

Mr. Tinning: Q. Mr. Hindmarsh, when this cave-in occurred, you described how it occurred early in the morning and it continued throughout the day to fill in the tunnel; you said you thought it went up 35 or 40 feet into the top. You did not remove the material—all of the material out of the caved area; you drove— You put your spiling across there, and put in concrete, and then grouted in there, did you not?

A. No; we did not grout there, Mr. Tinning.

Q. What did you do, to fill that void?

A. Well, the void was filled; the cave filled the void; it caught itself up, and we tunneled [160] right through it, and left the loose ground above us.

(Testimony of Victor G. Hindmarsh.)

Q. Those boulders,—the white material you saw in the roof,—indicated they were some of the intrusive material above the top of the roof of the tunnel?

A. Yes, I think there was. I think the cave followed that.

Q. Followed that intrusive material up?

A. Yes.

Q. So, as you had driven through your tunnel, you would cut off the top of this kidney that was hanging up there in this cherts?

A. Well, I don't think that we did; I don't think we did that. I don't remember, but it may have shown some, in the roof; I am not sure whether it did.

Q. You stated you found boulders and white material?

A. Well, that came further up, after the cave-in. I don't know how far up in the tunnel; the kidney may have been 40 feet up above the tunnel, so far as I know, because those kidneys come in at any angle or any place.

Q. You ran into a good many similar formations as you went along, as you had gone along through the tunnel, before you came to this point?

A. Lots of them.

Q. So, it was nothing surprising or new to you by that time? A. No.

Q. When you were studying this estimate and the other matters which you have referred to, in

(Testimony of Victor G. Hindmarsh.)

1934, when you were with the W. A. Bechtel Company, you had knowledge of the geologist's report, did you not? A. Yes.

Q. At the time you were driving this tunnel, I suppose you had that same information in your mind?

A. Well, no; I had forgotten all about the geologist's report by that time.

Q. Did not pay much attention to it?

A. No; I didn't pay much attention to it.

Q. When you were driving?

A. No; because the ground was so much [1662] different than the geologist's report showed, I paid no more attention to it.

Q. Well, I am going to read you the first paragraph on page 16 of the geologist's report—it is Exhibit 22:

> "In driving through the cherts, the combination of crushed zones and water often present difficulties. The crushed rock (with or without water) may flow out into the tunnel almost like quicksand, or, if it holds together better, it may develop considerable pressure, until the water pressure is relieved by free flow into the tunnel. In the Claremont Tunnel the careful driving forward of spiling was necessary in the more broken and the crushed portions of the chert. In certain cases where a broken or crushed mass of rock lies within intersecting fault planes, and thereby loses its bond to surround-

(Testimony of Victor G. Hindmarsh.)

ing rock, it may slump down into the open working, leaving a chamber in the wall or roof."

Isn't that what happened here?

Mr. Marrin: Where are you reading on that page, Mr. Tinning?

Mr. Tinning: Page 16; the first paragraph. I read from the first of the paragraph down to the next to the last line.

The Witness: A. Yes. He said they might drop down. If they did, we should let them come down. We did, in this case.

Q. Intentionally? You left the boulders up there?

A. Well, we held some of them up there afterward.

Q. You changed your practice after you discovered what to do in the tunnel?

"If such unsupported blocks or masses are met, it would probably be best to let them down or remove them, before placing the concrete of the completed structure."

Well, from your last remark, do I understand, Mr. Hindmarsh, that you were trying to comply with Dr. Louderback's report?

A. No; I wouldn't say that. I was trying to hold it up. [1603]

Q. You made no change in your timber, at this point, other than, as I understand you to say, you placed 14 by 14's in this area, in the roof?

(Testimony of Victor G. Hindmarsh.)

A. Yes, as I remember it, we placed 14 by 14's in there; placed them in there for some little distance.

Q. And these matters which we discussed a short time ago, about shooting out sets in drifts at 126+50, 125+12, 126+35, do you think they had nothing to do with loosening the material in the roof of that tunnel?

A. No; I do not, because that was in the wall plate drift, and did not come anywhere near the roof.

Q. Well, Mr. Hindmarsh, it might have been in the wall plate drift; but the wall plate drift runs under a part of the roof? We will look at Plaintiff's Exhibit 42. Take the wall plate drift; that was pretty close to the roof,—the outside, upper corner of those drifts—aren't they?

A. I would say that is quite a ways from it, with solid dirt over the top.

Q. Well, I am referring just to the roof. I have always thought it was any part above the eaves.

A. I was taking the wall plate and the eaves, and going on up.

Q. What do you mean by the "roof"?

A. Well, it is from the face of the wall plate just about where it hits the top of the wall plate.

Q. Well, one side of a wall plate drift forms a part of the roof that we are talking about?

A. Well, it forms a part of that segment section.

Q. It is true, if explosions were permitted in a

(Testimony of Victor G. Hindmarsh.)

wall plate drift at Section 125+35 and Station 125+50, that they were in close proximity,—within 20 feet, or so, of this material shown on the diagram; isn't that true?

A. Well, the stations seem to coincide. That is all I can go by.

Q. Well, that is what we are working on at this time. And those [1604] explosions in this tunnel were sufficient so that the District Engineer wrote you, on the 28th of January, and called your attention to the fact that they seemed to be extremely heavy; he felt, from the report of the shots, that——

A. No; I don't think that had anything to do with it.

Q. How would you explain that?

A. That would be very easy to explain. Mr. Boggs's anxiety over the reports of the shots that he heard—that is not an unusual thing in a tunnel; the cause of it is never dangerous; that kind of explosion is never dangerous to a tunnel.

The Court: We can all agree it is not helpful, can't we?

A. Well, it does not hurt it. The reason for a loud report is, in driving a tunnel, you use delayed——

The Court: Yes, I understand.

A. —and one part of your first shot is required to take the load off the other shot; and when you get a loud report, it is the same in any tunnel, it

(Testimony of Victor G. Hindmarsh.)

causes a lot of air vibration, which causes the powder to explode in the air, first, and causes a lot of vibration; it does not hurt a tunnel at any time.

Q. Is this vibration all in the air?

A. It is all in the air, because the powder explodes in the air.

Q. A quarter of a mile away, it may shake the earth?

A. The earth doesn't shake, your Honor; when you have a tunnel, it is like inside a rifle barrel, you cause a heavy concussion of air there, and it comes out the face, and if there is anything like windows around there, it will shake them.

Q. It won't interfere with the earth?

A. Not a bit.

The Court: I am glad you corrected me on that.

The Witness: The shot really that does the damage in a tunnel——

The Court: I follow you; I don't disagree with you, but I [1605] would have been laboring under a delusion that the earth might shake——

A. No; it would not, in that kind of a job. It is like throwing a fire cracker up into the air; it makes a concussion, but it don't shake the earth. The thing that would do the damage in there is the dull thud——

Mr. Tinning: Q. What was it that blew the sets out in these drifts,—the air?

A. That may happen in any tunnel, because you may get a boulder right in front of a shot, which

(Testimony of Victor G. Hindmarsh.)

will take the whole load; and it will come out like a rifle ball; but that is not an unusual thing. That happens thousands of times in a tunnel. You can shoot timber out of some types of rock which come from behind and take the whole charge. [1606]

Q. It would not blow out all of the timbers in seven sets back of the draft face?

A. No, it does not take a big piece of rock to do that. That was only a temporary section, and that was before the permanent timber was put in.

Q. What about the ring sets that were blown out, was that air?

A. No, that was rock, a rock or boulder that had been taken out that was lying possibly over the charge that went off and that one boulder went up and happened to strike some segments and knock them out.

Q. Have you inspected the record of the explosive that was used within forty minutes before this cave-in occurred in the tunnel on the night of February 21 and the morning of February 22?

A. No, I have not.

Q. Would it surprise you to know that there was some 225 pounds of powder fired off in that tunnel about forty minutes before this collapse?

A. I don't know to that effect. If all of the rings in all of the drifts were shot and all the benches were shot, 220 pounds of powder would not be——

Q. (Interrupting) Would not be out of the way? A. Would not be excessive.

(Testimony of Victor G. Hindmarsh.)

Q. If there were 30 holes in the core face that night when that shot was fired about forty minutes before the collapse, would that have anything to do with it?

A. I don't know if there were 30 holes; I don't know how much powder was put in there. I was not there at the time of the shot, and I have not any record of just how many of the holes there were, because these holes changed on every round.

Q. If the inspectors of the District had a record of thirty holes would you think that was accurate or out of the way?

A. I would not know whether it was accurate or not.

Q. You know they kept a record?

A. I don't know whether he kept a record of the number of holes that were drilled, or the amount of [1607] powder. In fact, I am very doubtful if you have got any record of the amount of powder used.

Q. Would you like to see it?

A. You may have a record, but how it was kept is another proposition.

Q. Do you know a man named Hartwell?

A. Yes, I knew Hartwell.

Q. An inspector for the District. There was a man continuously in the tunnel at all times while the work was going on, Mr. Hartwell at times and Mr. Belcher at times?

A. Yes, there was an inspector on the job at all times somewhere around on the job.

(Testimony of Victor G. Hindmarsh.)

Q. You are not certain whether they kept a record of the holes that were drilled in the ground?

A. I doubt very much whether they did.

Q. Would you say that 30 was an unreasonable amount? A. No.

Q. You have already stated that 225 pounds of powder was likely to be the right amount?

A. No, I said that was used in drifts and in the rings and in the bench, if they shot all of those places at that time 220 pounds of powder would not be very far out of line.

Q. Mr. Hindmarsh, this morning there was introduced here as Plaintiff's Exhibit No. 92 a letter addressed to the Six Companies of California, dated April 16, 1936, which accompanied the diagram which you showed to Judge Roche, and discussed about wall plates, and rings, and wall plate drifts, etc. This was a letter from the Industrial Accident Commission to Six Companies, and I believe you said you received this letter. I would like you to consider the matters in the terminating paragraph of this letter: "Provision must be made against undermining the wall plates by the Bagley system of excavation, and also against over-shooting the side walls directly under the wall plates." It is true, is it not, that at various times the Industrial Accident Commission people had been in conference with you about the shooting under these wall plates?

A. No, that is not true. [1608]

Q. It is not true? A. No.

(Testimony of Victor G. Hindmarsh.)

Q. What was it that occasioned that letter of April 16, 1936, in which they warned you against over-shooting the side walls?

A. It was just a natural warning. I was in conversation with Mr. Reinhardt all through that job and I don't think he ever mentioned at one time to me that I was shooting too heavy.

Q. You think that when he put in about overshooting the side walls directly under the wall plates it was just out of an abundance of caution and that nothing had happened before that led him to put that warning in the letter?

A. I think that is right, it was a natural thing for him to write about.

Q. Mr. Hindmarsh, if I remember your testimony this morning you said at the time that this slide occurred that you thought the concrete was about 125 feet back. Was that from the core or from the place where the slide took place?

A. That was from the core. The reason I said that was because that was about the distance I kept the concrete at all times.

Q. Have you checked your record on it?

A. No, I have not.

Q. Would it surprise you to know that the distance from the core to the concrete was 234 feet on February 21 in the north tunnel?

A. I would doubt that very much unless the record showed it.

Q. Will you examine the document, Plaintiff's Exhibit 58 for identification, and perhaps one of

(Testimony of Victor G. Hindmarsh.)

your engineers can check that with you; but that is what an observation of that record shows, the face of the core, the total core was 127+07, and the concrete was, the easterly end of the concrete was at station 124+66, 234 feet. Have you got that?

A. If the record shows that that is true.

The Court: The witness testifies if the record shows that that is true.

Mr. Wittschen: Will it be stipulated that the record shows that fact? [1609]

Mr. Marrin: He is examining it.

A. The record seems to.

Mr. Tinning: Q. In other words, the record which Mr. Wilde is showing you indicates it was 225 feet from the toe of the core to the end of the concrete: is that correct?

A. Yes, the record seems to show that.

Q. Now, with respect to the concrete that was placed in the east portal, Mr. Hindmarsh, that was done during your administration of the work, was it not? A. Yes.

Q. You know there were two rings poured sometime after September, 1935.

A. Yes, I had charge of the pouring.

Q. What method did you use for pouring that concrete?

A. A Hackley gun, that is, we poured—most of it was poured with buggies, and there was a section right in the roof of the tunnel that was let out that was poured with a Hackley gun.

(Testimony of Victor G. Hindmarsh.)

Q. Did you ever see that concrete after the forms were stripped?

A. You mean at the westerly end?

Q. The westerly end of the concrete.

A. No, I could not see that, because it was buried.

Q. There was a bulkhead at the end of the form?

A. There was a bulkhead there.

Q. Would it surprise you to know it looked the way it shows in this photograph, at about 12 feet of the tunnel it ran from 4 inches thick at the westerly end back up to two feet?

A. That was right——

Q. Right in the top of the core.

A. Right in the roof, right up against the bulkhead?

Q. Yes.

A. That might have been the case, I don't know.

Q. That would not be what you would call good concrete, would it, 12 feet?

A. Yes, as far as the concrete was concerned, it was good concrete, but it is the presence of the hole that is not good.

Q. So when you have voids in concrete such as you had at the westerly [1610] end it was good concrete except where there was no concrete?

A. Yes, but a hole of this kind would not bother any because you catch it in the next pour in.

Q. If the earth did not catch it in the meantime?

A. If you poured right along you would catch it.

Q. You poured this in September?

(Testimony of Victor G. Hindmarsh.)

A. That was excavated for the first time at that point, the form was right against the earth.

Q. It was poured in September, 1935, and when you left the work on June 13 it was still remaining in that condition?

A. Well, it just had been excavated.

The Court: I want to clear this up. When was the next operation with relation to this?

A. There was not anything more done there until the tunnel came from the west end, with the excavation. This was right up against the excavation.

Q. The next part of this operation, the next pour.

A. Came right there.

Mr. Tinning: Q. That was from some other contractor when *he through* a year or more later?

A. Yes.

Mr. Tinning: We offer this photograph in evidence, if your Honor please, as Defendant's Exhibit in proper order.

(The photograph was marked "Defendant's Exhibit N-4.")

[Set forth in the Book of Exhibits at page 469.]

A. (Continuing) It is nothing unusual to leave a hole like that when you are using a Hackley gun; I used to do it all the time and shoot right into it on the next operation.

Mr. Tinning: No further questions.

Redirect Examination

Mr. Marrin: Q. Mr. Hindmarsh, the sagging in of the wall plates before the wall plate left the wall

(Testimony of Victor G. Hindmarsh.)

plate drift, that is before the core was excavated up to that point, would it do any harm?

A. No, it would not do any; when it came off the bench in the open [1611] it would just mean that you would shorten the plumb posts, but as long as the timber was properly wedged up against it it would not do any harm whatever.

Q. Your segments would be longer and your posts would be shorter, isn't that true?

A. No, it would not lengthen your segments, because if the wall plate settled it was due to pressure from the top, and the whole roof would probably come down; it might not even loosen a wedge——

The Court: It might come down uniformly?

A. It might come down uniformly and the weight on that wall plate would sag it.

Mr. Marrin: Q. Was the shooting used in these tunnels light or heavy shooting?

A. It was all light shooting as far as tunnels go, very light shooting.

Q. Much lighter than is often used?

A. Oh, yes.

Q. Now, as to the shape of this lens of material, Mr. Hindmarsh, I don't know that it was clearly brought out, but you said, I think, on your direct and cross-examination that it was about two feet wide at the wall plate line where it left the tunnel.

A. That is what I remember.

Q. And after the cave-in occurred did that appear to have widened out of the tunnel?

(Testimony of Victor G. Hindmarsh.)

A. Yes, this face of the tunnel where you could look back into the cave, you could see that it widened out into a kidney formation.

Q. That widening out was discovered when you were excavating the earth that was covered?

A. Yes, that was correct.

Q. Now, Mr. Tinning referred you to the paragraph in the geology report which said that the material might resemble quicksand. Did this material have any resemblance to quicksand?

A. No, none of the intrusion did.

Q. And at the point where the cave-in occurred did the material [1612] flow out into the tunnel?

A. No, the lens was quite hard; in fact, when it caved it caved in large boulders.

The Court: Wasn't there a running formation of some kind?

A. Well, when it caves, of course the cherts is laminated, anyway——

Q. But I mean the material away from the cherts, this white material that shows in the photograph.

A. It came out in big chunks, your Honor, in large boulders. You can see these boulders lying there.

Q. What is that?

A. That is in place. That is what is left after it caved. That is a cross section of the lens that is shown in place. That is not moving.

Q. Is that what you have in mind, material like that? A. Yes, like that.

(Testimony of Victor G. Hindmarsh.)

Mr. Marrin: It was in place, as shown on this photograph.

The Court: You mean in place, in the natural way? A. That did not move, it was hard.

Mr. Marrin: Q. You stated in answer to some of Mr. Tinning's questions on cross-examination that so far as you know some of the sets might have been blown out in the wall plate drift. Were those simply temporary sets?

A. Yes, those were temporary sets.

Q. And would the blowing out of those sets, if it happened, have any effect on the strength of the permanent tunnel timbering?

A. No, none, whatever.

Q. They were subsequently all replaced with permanent sets? A. That is right.

The Court: Q. Do I understand that those that were blown out were temporary sets?

A. Going through the drift, every six feet we put in a temporary set and we follow behind that with a permanent set, in between each one of those.

Q. That is where the temporary sets were blown out the permanent [1613] sets were not in?

A. No, they were not in.

Mr. Marrin: Even if 240 pounds of powder was used in the shot a short time before this cave-in would you consider that was heavy shooting?

A. No, I would not. It depends, of course, on the size of the shot, how much ground you are moving.

The Court: And the material?

(Testimony of Victor G. Hindmarsh.)

A. And the material. As a rule, this ground only took about three-quarters of a pound of powder—as the record shows, about three-quarters of a pound per yard, which is very light shooting in any tunnel that has to be shot at all.

Mr. Marrin: Q. I think you said that the length of the hole had nothing to do with whether the shooting was heavy or light? A. No.

Q. These six-foot holes were the holes that were used next to the outside perimeter of the tunnel, were they? A. Yes, under the wall plates.

Q. And the 12-foot lifter holes were placed under the core after the rings and wall plates had been excavated? A. Yes, after that.

Mr. Marrin: I think that is all, if your Honor please. It may possibly be that after we have checked these exhibits over we would like to ask Mr. Hindmarsh a question or two further on redirect examination.

The Court: Very well.

HOMER MERRITT,

called for Plaintiff; sworn.

The Court: Q. Where do you live?

A. 9923 Beach street, Oakland.

Q. What is your business or occupation?

A. Well, at that time I was working at the tunnel, at this time I am in a coal yard in Oakland.

[1613A]

(Testimony of Homer Merritt.)

Q. In business for yourself? A. Yes.

Mr. Marrin: Q. Mr. Merritt, at the time of the cave-in on February 22, 1936, you were employed by Six Companies of California, were you not?

A. Yes.

Q. And in what capacity, what were you doing?

A. I was chuck tender.

Q. Were you on duty at the time this cave-in occurred? A. Yes.

The Court: You might find out what a chuck tender is.

A. That is a miner's helper, that does everything.

Q. He is a handyman around? A. Yes.

Q. He does the heavy work for the miner?

A. Yes.

Mr. Marrin: For the purpose of making the record clear, I would like to offer for illustration purposes a diagram which is on the easel, as Plaintiff's Exhibit next in order.

(The diagram was marked "Plaintiff's Exhibit 97.")

Q. Now, referring to this diagram, Plaintiff's Exhibit 97——

The Court: Q. Do you understand the diagram? Can you see that diagram there? A. Yes.

Q. If there is anything you do not understand about it you ask the attorneys and see that they do not confuse you after you get started.

Mr. Marrin: Q. You have seen this diagram before? A. Yes.

(Testimony of Homer Merritt.)

The Court: The only thing I have in mind is, a witness is many times called to the stand and shown a diagram and does not understand it, and I thought it well to ask him if he understood it.

A. I think I understand it.

Q. You are in doubt about it?

A. This would be the face of the core, here, and this would be the drift.

Mr. Marrin: Q. Yes, and this is the shovel, and the hoist jumbo you see. A. Yes.

Q. Will you show us, Mr. Merritt, on this diagram where you were [1614] standing at the time the cave-in occurred?

A. I was standing right there.

Q. What were you doing there?

A. I was flagging the Bagley.

Q. That is the scraper?

A. That pulls the dirt out of the drift, and drops it over the core, and the man that operates it was out on here, and I was flagging this man out here when to stop here and drop the dirt and when to send the Bagley back in again at the time of the cave-in.

Q. Will you state what happened, what you did just before the cave-in?

Mr. Tinning: Which drift is that shown on the diagram?

Mr. Marrin: Is that the drift on the south side of the north tunnel?

A. The south side of the north tunnel.

(Testimony of Homer Merritt.)

Q. I will mark with an "X" on Plaintiff's Exhibit 97 the place where Mr. Merritt said he was standing. Now, what operation was being carried on at the time the cave-in occurred, Mr. Merritt?

A. Well, the crew was going off and another crew was coming on, I went on at 11:30, and we were taking the dirt out into—this would be an open space here, just ahead of the rings, and we could not drop the dirt over at the time because they were putting certain new posts under the wall plate face, and we could not drop any dirt over that face, so we pulled the dirt back and piled it in here while they were setting these posts, and they had hollered "O. K." down, and I had kicked the dirt down, and they called for slack, they loosen the cable from the Bagley, and the steam shovel was setting in here getting ready to muck the dirt and put it over when all at once I could not see anything between here, in fact, it came just like that at the time.

Q. Did it come without any warning?

A. It came without any warning, as far as I could see, it came just like that. I immediately [1615] ran back in and told the shift that the cave came down.

Q. As far as you could observe prior to the cave-in, did the timbers appear to be in good shape?

A. As far as I observed I saw nothing wrong with them; I was practically looking at them between the spot where the cave was and where the jumbo set up, practically all the time.

(Testimony of Homer Merritt.)

Q. There was nothing prior to the cave-in to warn you that it might be going to cave?

A. Not a thing.

Q. Now, then, I am going to extend in pencil the coming out of the wall plate, just about that way, as I have drawn in pencil there. As I understand you, just prior to the cave-in the posts under the wall plate had been set up close to the core?

A. That is where we piled the dirt up, waiting for them to set the post.

Q. That operation had been completed prior to the cave-in?

A. They had hollered "O. K." and I had mucked the dirt down in the bottom to be taken out by the steam shovel and loosened the Bagley, when the cave-in came.

Q. How did you get out of there?

A. Well, it did not come back, there was a slope, plenty of room back over the core, it was open where the cave did not come, and I immediately ran out, my boy was working in the drift on the opposite side, and I ran over the top of the core, that is where it had not fallen, and warned him to stay in the drift, and a lot of them did run out through the fallen rock, and then I stayed in there and there were two boys walking on the catwalk, two muck boys that came in on the catwalk, in the middle of the tunnel, just as the cave came; one of them made a lunge and landed on the core, and the other one went down with the timbers and went under there,

(Testimony of Homer Merritt.)

I judge, about seven feet deep, down under this mass of timbers and rock, and we could hear [1616] him hollering down there, you could see his legs, he was just hemmed in, he was not hurt very bad, and was just pinned in so he could not get out, and we proceeded to throw big timbers from this side, on the back side of the cave, and, of course, more crew came in, and we pulled big timbers in, and Mr. Garrett and my boy and I were down trying to dig him out from underneath these timbers, and we had him just about ready to carry out when there was a big segment which dove right down over his breast, and I went to pull it out, and in backing out from under this, that is when I got the scar which is on my head when I got hurt and I was carried out. That is about all I remember from then on.

Q. Referring to the diagram which is on the right part of Plaintiff's Exhibit 97, this place where I will mark the "X" is the drift in which you were standing, is it, Mr. Merritt, just before the cave-in?

A. On the right-hand, right in the mouth of the drift.

Q. The cave-in came at about a point opposite the shovel?

A. Between the jumbo and the mouth of the drift. The shovel set just a little bit to the side of the wall plate.

Q. And you jumped down here and came out around this side?

(Testimony of Homer Merritt.)

A. Well, I finally came out, but I just went over the ring to the other drift, but I did not go out until they carried me out.

The Court: Q. Did your boy get hurt?

A. No, he was not hurt. He was under these timbers.

Mr. Marrin: Q. You went on duty that night at 11:30 p.m.? A. Yes.

Q. Was there any shooting done while you were on that shift?

A. The shooting, if I remember, was done by the crew coming off and then we went on, as I remember it; I don't remember that there was any shooting while I was on shift.

Q. Your recollection is, then, that the last shot was fired before 11:30?

A. The crew coming off usually always shoot and the [1617] crew coming in do the mucking up.

Q. This cave-in occurred about 2:30 in the morning? A. Well, about 2:30 in the morning.

Mr. Marrin: You may cross-examine.

Cross Examination

Mr. Tinning: Q. How do you fix the time?

A. Well, I know it was getting pretty near time to eat.

The Court: Q. What time was it you went on?

A. At 11:30.

Mr. Tinning: Q. At 11:30 you went on, and you figured it was about meal time the time this accident occurred?

(Testimony of Homer Merritt.)

A. It was just a little bit before lunch.

Q. Did you have a watch with you?

A. No, I did not have a watch with me at the time.

Q. Did you hear any shooting in the other tunnel while you were working there that night?

A. I could not recall that I heard any in the other side because they were shooting. I did not pay much attention to that. [1618]

Q. You did not pay much attention, during the different operations? A. Yes.

Q. In feet, how far back from where—from the toe of the slope, or from where you were standing in the drift, was it to the place you say you saw the cave come in?

A. Oh, I should judge it would be back about—from the first I seen, I judge it would be back about 20 feet to as near as I seen it occur, you know, between the Jumbo and the face. The Jumbo was next to the face——

Q. Well, was it about opposite the shovel?

A. Well, it come just a little bit toward the face from the shovel, as near as I could judge.

Q. In other words, somewhere about where I am pointing now?

A. Yes, somewhere about in there, I judge; about where it come from; I judge it come from about the "B" posts.

Q. That would be the "B" segment; that would

(Testimony of Homer Merritt.)

be the two sections,—the second section over the wall plate?

A. Yes; somewhere up in that corner; looks like it come to me.

Q. That was the first thing you saw here, was this segment, say, 6 to 8 feet above the wall plate?

A. I didn't see any segment in at all; all I saw was a mass of rock coming like that.

Q. You heard no cracking of timbers; your attention was attracted to it by the dust and turmoil you saw coming out of the side of the south—the south side of the tunnel, 6 or 7 feet above the wall plate?

A. No. It would be more than that. The "A" post was——

Q. 7 feet, was it? A. I could not tell you.

Q. Well, approximately?

A. Well, approximately around that; and the top of the "B" post——

Q. The top of the "B" post; that was two segments up?

A. Then it would be the one that goes over to the cap; somewhere in that area in there, where it looked to me like it come from.

Q. Did it drop down and cover the shovel over right away?

A. Well, I couldn't see, from my side; it was covered when I could see it; the side I was on was covered.

(Testimony of Homer Merritt.)

Q. In other words, immediately after the first run of material came, then the timbers cracked all the way around, falling down in there?

A. Well, the timber practically came ahead, with the dirt; it all come just together.

Q. Did the timber, all the way across to the north side of the tunnel, come down?

A. Well, now, I didn't look at the other side exactly to see what it did, because I left right there.

Q. I imagine this was a pretty exciting moment. There was nobody seriously hurt there?

A. Well, I don't know how seriously you call it, right at the time of the cave.

Q. Well, you were injured, as you have described; but you recovered completely?

A. No; I was not—it was the other boy that was covered. I was down, coming out, when I got hit. I was not covered there. A big rock come down and cut me across the head.

Q. You did not understand me. I say: You have recovered completely?

A. No; I have not; I am rather hard of hearing.

Q. You receive compensation from the Contractor?

A. I received a settlement from the insurance company.

Q. The other man recovered—has he?

A. Well, so far as I know; I have never seen him from that day to this.

(Testimony of Homer Merritt.)

Mr. Tinning: Thank you.

The Court: Q. How long have you followed tunnel work?

A. Oh, I have been, off and on, at it ever since I was eleven years old; I worked in the coal mines down South when I was a boy.

Q. Down South where? A. West Virginia.

The Court: We will take a recess until tomorrow morning at ten o'clock.

(Thereupon, an adjournment was taken until Friday, May 6, 1938, at 10 o'clock a. m.) [1619]

Friday, May 6, 1938
10 o'Clock A. M.

The Court: You may proceed, gentlemen.

E. F. HALL,

called by plaintiff; sworn.

Direct Examination

Mr. Marrin: Q. Where do you reside, Mr. Hall? A. Burlingame.

Q. What is your occupation?

A. I am an engineer right now.

Q. You have done surveying work? A. Yes.

Q. When did you first commence doing surveying work?

(Testimony of E. F. Hall.)

A. When I attended college, I would do it in my summer vacations; about 1923, I think, I started.

Q. You have followed that work, have you, since?

A. Intermittently, except for a period of about four or five years.

Q. Were you engaged or employed by Six Companies of California in connection with the construction of the Broadway Low Level Tunnel?

A. I was.

Q. When did you go to work with Six Companies of California?

A. It was the latter part of April or first of May, I think, 1935.

Q. How long did you continue in the employ of Six Companies of California, Mr. Hall, thereafter?

A. Until the tunnel was closed down in June the following year, I believe.

Q. What were your duties with Six Companies of California?

A. To furnish lines and grades for driving the tunnels.

Q. There is, on the easel, a line drawing from which I would like to have you illustrate your testimony, for the purpose of getting it in the record.

The Court: Q. Are you familiar with that diagram? A. Yes.

Q. What is it? Describe it, for the purpose of the record.

(Testimony of E. F. Hall.)

A. It is a plan showing the section of one of the tunnels, with the wall plate drift system. [1620]

Mr. Marrin: May I offer that as plaintiff's exhibit next in order, so that we may have an exhibit number on it?

Mr. Tinning: No objection.

(The diagram was marked "Plaintiff's Exhibit No. 98.")

Mr. Marrin: The witness is referring to Plaintiff's Exhibit 98, in his testimony.

Q. Would you go ahead and explain to the Court, Mr. Hall?

A. This is just a plan of a tunnel, with two wall plate drifts, and showing about where the core would be.

Q. This part of——

A. This is the drawing——

Q. This part of the drawing represented by the part marked "Core," Plaintiff's Exhibit 98, is a complete tunnel; the excavations have been completed? A. Yes.

Q. The part to the right of that point would be the wall plate drift? A. Yes.

Q. Would you take the pencil, Mr. Hall, and draw in there, to illustrate to the Court, just the operations you performed in setting the lines and grades?

A. Well, we put our lines and grades in there every day. In order to get those in, it necessitated

(Testimony of E. F. Hall.)

going back in the tunnel from two to three hundred feet back of the core.

The Court: Q. What is the center line?

A. From the core. The District had monuments in; and I had to go up, on these monuments, bring that line up and then offset again up on the drift, and keep the points and the headings up on the monuments.

Q. There is one thing that confuses me. In going ahead in those drifts, could you tell which way you were going? How could you tell that?

A. Well, that is where the surveying comes in.

Q. That is what I do not understand. Will you tell me about that?

A. Well, you set the instrument up on that monument, and backsight on another monument, and plunge a line in, and put in a hub; then—I forget the distance there; but, say, 12 feet: you turn right [1621] angles and put another one, and then back in the tunnel and put another one over here, and then set up here and look back and you could plunge that line ahead.

Q. What do you use—your eye?

A. No; with an instrument; a transit; set the transit up here.

Q. What does the transit do?

A. It is a surveying instrument,—an instrument used in surveying.

Q. Well, when you drift and you drift ahead, say, 50 feet, how do you get your center?

(Testimony of E. F. Hall.)

A. By using these lines; you use parallel lines; you set up here; and when you sightback here—the transit—you clamp this on here, and then just turn it over and you have it in the same place.

Mr. Tinning: Q. At the same angle?

A. At the same angle.

Q. So you get a straight line? A. Yes.

The Court: Q. Follow out that line you made,—a straight line.

A. Yes; offset here, and the drift would be up here; it would be——

Q. Yes, I follow that now. Proceed.

Mr. Marrin: Q. If I understand you, you have set the transit on this point, and come back here and get the transit in a straight line?

A. You set the transit here, and then you sight on this point; and then you move over.

Q. Then you swing your transit over, and that gives you the same line? A. Yes.

Q. That is set up here?

A. It requires another setup; you necessarily set up here, and set up near the face of the tunnel—not the face, but just at the start of the drift.

Q. If I understand you correctly, Mr. Hall, each day, on the drift, you come back to these monuments. How far were those monuments, from the face of the core?

A. I believe they run from two to three hundred feet.

Q. In the fully excavated part of the tunnel?

(Testimony of E. F. Hall.)

A. Yes. [1622]

Q. Then, each day, you would run this line up here two or three hundred feet to about the core; run it over to each side, and then project those lines ahead in the drift?

A. Well, it did not require it each day.

Q. Not every day?

A. No. Every other day.

Q. Every day. How long were those drifts usually ahead of the core?

A. Well, I should say around 100 feet.

Q. Then you set a line here, as a result of that work, which would indicate the line along which the drifts should be constructed ahead of that?

A. That is true. That was my work: on the line and grade, and to furnish that in the drifts.

Q. Those lines and grades which you set were at the end of the drift?

A. To the timber set line behind the drift, yes.

Q. Did you also set a grade in there?

A. The grades were all set, each day; timber sets.

Q. In the drifts? A. Yes, sir.

Q. It was necessary for the men to use those lines and grades, in order to know how to proceed with the construction of those drifts, was it not?

A. Absolutely.

The Court: Q. The beginning point is the monument? Who furnished the monument.

A. The District furnished the monument.

Q. That was your starting point?

(Testimony of E. F. Hall.)

A. Yes, sir.

Mr. Marrin: Q. The District furnished these monuments; but they did not furnish anything except those monuments; is that correct?

A. Yes.

Q. All the rest of this work was done by the Contractor? A. That is true.

Q. How many people were in your surveying party? A. I had two assistants.

Q. Besides yourself? A. Yes.

Q. You did part of the work yourself?

A. I ran the instrument [1623] and did all the calculations.

Q. How many times were you in the drifts—I mean, on the average, a day?

A. Well, I was in each drift each day, and sometimes twice a day.

Q. The lines and levels were run in each drift, were they not? A. Yes.

Mr. Marrin: You may cross-examine.

Mr. Tinning: No questions.